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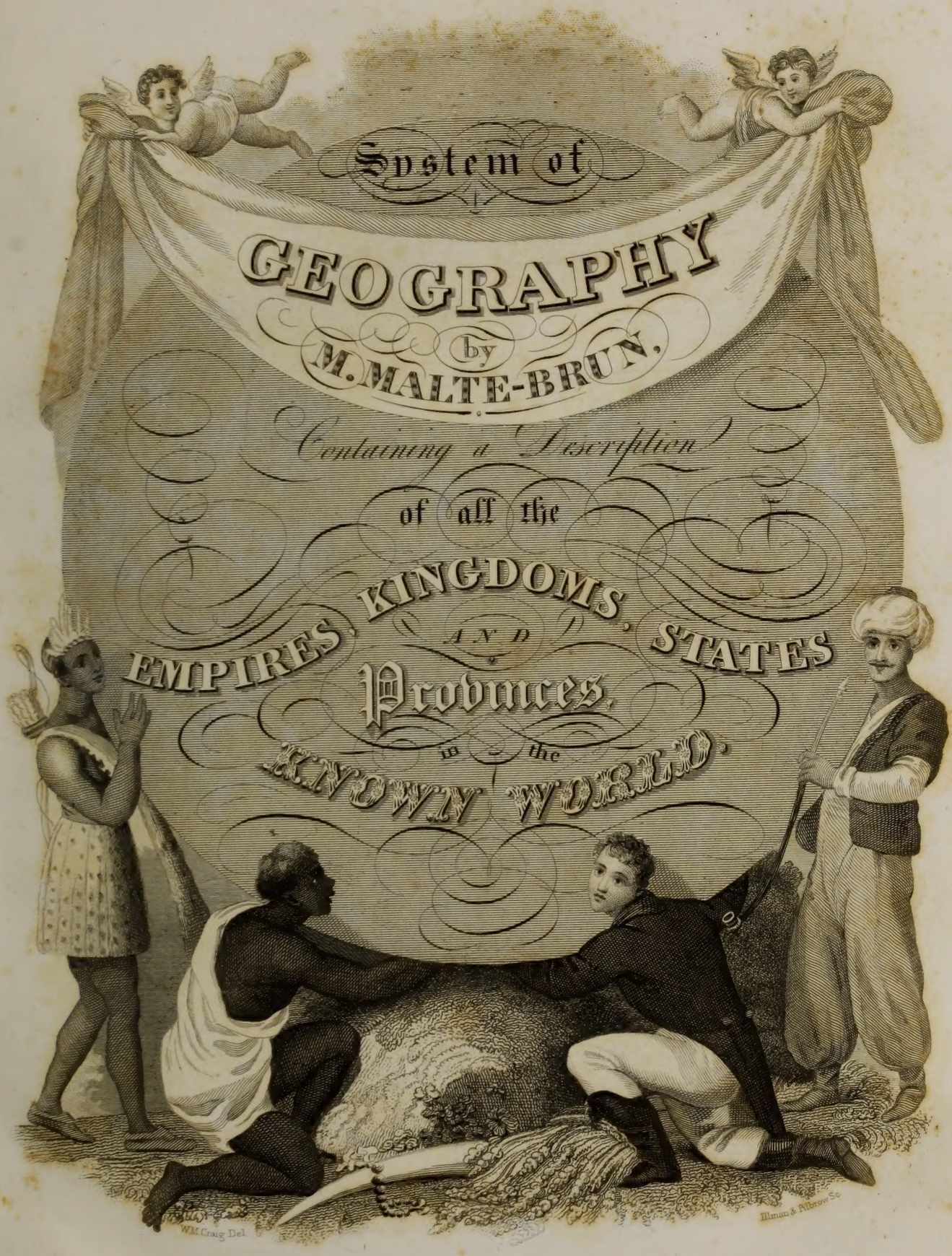

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A

SYSTEM

OF

UNIVERSAL GEOGRAPHY,

OR

A DESCRIPTION

OF

ALL THE PARTS OF THE WORLD,

ON A NEW PLAN,

ACCORDING TO THE GREAT NATURAL DIVISIONS OF THE GLOBE;

ACCOMPANIED WITH

ANALYTICAL, SYNOPTICAL, AND ELEMENTARY TABLES.

BY M. MALTE-BRUN,
EDITOR OF THE "ANNALES DES VOYAGES," &c.

WITH ADDITIONS AND CORRECTIONS,

BY JAMES G. PERCIVAL.

EMBELLISHED WITH

A COMPLETE ATLAS,

AND

A SERIES OF BEAUTIFUL ENGRAVINGS.

IN THREE VOLUMES.

VOL. I.

BOSTON:
PRINTED AND PUBLISHED BY
SAMUEL WALKER.

1847.

DISTRICT OF MASSACHUSETTS, *to wit :*

District Clerk's office.

BE IT REMEMBERED, that on the third day of January, A. D. 1828, in the fifty-second year of the Independence of the United States of America, Samuel Walker of the said District, has deposited in this office the title of a book, the right whereof he claims as proprietor, in the words following, *to wit :*—

System of Geography. By M. MALTE-BRUN, editor of the "Annales Des Voyages," &c. With additions and corrections, by JAMES G. PERCIVAL. Embellished with a complete atlas, and a series of beautiful engravings. VOL. I. Stereotyped by James Conner, New-York.

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JNO. W. DAVIS. { *Clerk of the District of Massachusetts*

ADVERTISEMENT.

When we undertook to prepare this edition, we only engaged to make such additions, and corrections in point of fact, as would adapt it to the present state of science, and particularly to this country. We have since found it necessary, from the imperfect state of the translation, to revise it throughout on the original, and we flatter ourselves that many errors will be thereby avoided. This edition, then, will differ from others by the addition of notes, and by the correction of all errors in translation, and in point of fact, which have caught our notice. We have endeavoured to give the whole work a careful revision, and, although we do not pretend to have rendered it perfect, yet we trust it will not be found seriously defective. We need not say any thing as to the value of the work. It has been already sufficiently established in the good opinion of the public. We have had to perform, in this edition, a very humble, although a laborious office, and if we have rendered the work more complete, in any respect, we shall feel that we have not altogether failed in what we have undertaken.

J. G. P.

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MEMOIR

ON THE

LIFE AND WRITINGS OF MALTE-BRUN.

BY M. J. J. N. HUOT.

Malthe-Conrad Bruun, whose name in France has degenerated into that of Malte-Brun, was born at Thister,* in the province of Jutland, in Denmark, on the 12th of August 1775. His father, formerly a captain of dragoons, was counsellor of justice, and commissioner of domains.

He watched over the education of his son with all the care of a good father, and the judgment of an enlightened man. The young Conrad, whose faculties early developed themselves, so fully answered his father's expectations, that he had scarcely attained his fifteenth year when he entered the University of Copenhagen. His first examination was so brilliant that it procured him public approbation; the same year he submitted to a second with equal success; at length his third examination in 1791, justified all the hopes excited by his previous conduct. The excellent dispositions manifested by the young Conrad in his studies, determined his father to destine him for the church. He considered this resolution the more prudent, as Conrad was the eldest of three sons and three daughters; and he was led to hope that in adopting this profession, he would naturally prove the guardian of his young family. But endowed with a brilliant imagination, our student soon tired of the subtilties and nice distinctions of theology, though this science is less encumbered with them among protestants than among catholics.

At the university of Copenhagen, where he took his degrees, Conrad, whom we shall henceforth call Malte-Brun, only followed his theological studies in submission to his father's desire, but literature was his delight. Endowed with a great facility for learning languages, and for catching the niceties of inflection and the shades of delicacy by which they are distinguished, he was soon enabled to write French with a facility, an elegance, and a vigour, which no other foreigner ever acquired, and which placed him in the rank of our best writers. His first steps in the career of literature were marked with success. The harmony of his verse and the vigour of his thoughts gave promise to Denmark of a great poet; and his growing talents soon secured for him the general respect of the men of science and literature in the capital. At this time the influence which the French revolution exercised in Europe began to be felt in Denmark. The pretensions of the nobility and the supremacy of the clergy, after having for a long time harassed the nation, led them at length to renounce a delusive representation, and to submit to the despotic but paternal power of their kings; but now the accents of liberty began to be re-echoed, even in the bosom of this monarchy. In the societies of young literary men, where he was courted for his talents, they ceased to employ themselves

* Thye. (Gorton.)—Qu. Thisted (Thystad,) the town of Thy.—P.

exclusively with poetry, and found it necessary to mingle politics with literary subjects; the new ideas elevating the ardent mind of Malte-Brun, found in him one of their warmest supporters.

Though timid and reserved in conversation, he was bold and passionate in his writings. He proved this in the first pamphlet which he published, under the title of Wakeren,* or the Alarm Bell, the political sentiments of which drew down a legal condemnation upon the author.

The reputation which he had acquired determined him to abandon the ecclesiastical order, to which, on other accounts, he preferred that of the bar. The study of the law developed his independence of opinion and his enthusiasm for liberty. In 1795 and 1796, he edited a periodical which he entitled "The Aristocrat's Catechism," in which the public authorities found ground for commencing a process against him, which obliged him to fly to the island of Hven, belonging to Sweden. During his retirement, this celebrated residence of Tycho-Brahe inspired his muse; he composed there two poems, one in honour of a sea-fight between the Danes, under Bille, and the Barbaresques;† the other an ode occasioned by the death of Count Bernstorf, the minister, who observing the march of intellect, directed Frederic VI. to so many judicious reforms. Thanks to the intelligence of this statesman, in less than twelve years the face of Denmark was changed; the Danish peasants, restored to the same liberty as their brethren of Norway, supported with alacrity the burden of the military conscription, and the nobles, who were opposed to this enfranchisement, were astonished to see the price and revenue of their lands doubled. "The same spirit of humanity," says Malte-Brun, "dictated the wise regulations which in the Danish colonies changed the slavery of the negroes into a gentle servitude."

It was natural, that sincerely as Malte-Brun was devoted to his country, he should feel deeply the loss which Denmark sustained in the death of the wise Bernstorf, and the ode which he composed on this subject is reckoned one of the most beautiful lyric poems with which Danish literature is enriched; it is even said to have been crowned by the Royal Academy of Stockholm, but it is certain that it received from that society the most flattering approbation.

After a short sojourn in the land of his exile, he obtained leave to return to Copenhagen. His first care was to publish his poetical essays. This collection had all the success that he could wish, but as he never ceased to assert his country's right to that freedom which under the administration of Bernstorf she seemed on the point of obtaining, the party in power, interested in opposing reform, characterised the young poet as a discontented and revolutionary spirit. The hostility of his enemies again menaced him in 1799 on the appearance of a bitter political satire entitled *Tria juncta in uno*. Although cautioned by his friends that the ministry would now treat him with more severity than hitherto, he disregarded their warning, till the public prosecutor, taking up the affair, commenced proceedings against him. He therefore hastily sought an asylum in Sweden, where his reputation secured him protection, and his talents won him respect. The reception which he met with in this land of freedom, for a time beguiled the recollection of the wrongs he had suffered in his own country. In a short time he departed for Hamburg, where he superintended the education of the family of an opulent merchant. It was here he heard of that revolution which conferred on the French Republic a chief whose energy it was hoped would suppress faction without fettering liberty. From this period he resolved to adopt France as his country; and it is worthy of notice, that this resolution, which exerted so powerful an influence on his literary life, was not formed till the sentence of the Danish tribunals had condemned him to exile.

We saw him, says Bory St. Vincent, arrive at Paris about the period when the *coup d'etat* of the 18th Brumaire had just annihilated that which was sought for by the *patriote hyperboréen*. Malte-Brun applied this title to himself in relating to us one day, a short time after his arrival, the political

* Dan. *Vækker*, literally, a waker—an alarm clock or bell. *Vækkeren* (with the article,) the alarm bell.—P.

† Barbary corsairs—Algerines.—P.

vicissitudes which had driven him to seek refuge on the borders of the Seine. He professed, at that time, a high admiration of the man who was generally regarded as the director of the revolution, destined to console Europe both for the abuse of the ancient order of things, and for the faults which had provoked an ill-advised and obstinate resistance to their reform. But the Consulship for life soon opened the eyes of Malte-Brun, who, constantly engrossed by politics, inserted hostile articles in several of the journals. These articles, as vigorous in style as in thought, attracted the attention of a suspicious and usurping power, and the author was condemned to silence. From this period may be dated the hostility of the Danish writer towards Napoleon. This hostility is sometimes directed against France herself, which however had sufficiently indemnified him, by the reception she had given him, for the oppressive acts of a government which began to be burdensome even to herself. From this period also may be dated the assiduous attention devoted by Malte-Brun to that branch of physical knowledge on which his reputation is founded, and he took a distinguished rank among geographers as soon as he was restrained from employing his talents on the discussion of those interests to which above all others he might justly be presumed to be a stranger.

He had been little more than three years in France when he commenced, along with Mentelle, a work entitled *Geographie Mathematique, Physique et Politique*, in sixteen volumes. It was the first work of its class which combined force of expression and elegance of style, with variety of description and minuteness of detail. Before its appearance, the geographical works of France were mere compilations, destitute alike of judgment and of taste, uninteresting in narrative, and repulsive in detail. The modern geography of D'Anville was nothing more than a collection of antiquated treatises. Mentelle, notwithstanding his talents, had confined his labours to elementary works. Germany alone was possessed of several eminent geographers; she could boast of the writings of one of the originators of statistics, the learned Busching, who ended his days in Berlin; she saw many other distinguished men following in his footsteps, and perfecting the means for the advantageous application of statistics to the description of states. But neither in France nor in Germany was there a writer who, in describing the earth in its various relations, could communicate his information in a manner at once calculated to delight and instruct; this honour was reserved for a young stranger, who was constrained to exercise his talents under the patronage of a teacher of geography.

Mentelle, distinguished as a geographer, but unacquainted with foreign languages, had for a long time been compelled to repeat himself in his works, which were for the most part hastily compiled; and, besides this, his advanced age attached him to ancient customs, from which his new associate could scarcely divert him. Malte-Brun, on the other hand, drawing his materials from sources unknown in France, enlivening his descriptions with the colouring natural to a poet of twenty-eight, exhibiting in his reflections upon manners that philosophy which lends so much interest to the description of a country, soon acquired in France a reputation which rapidly spread into Germany, where he was already known to the learned by the correspondence he had maintained with several of them. The public understood, that although Malte-Brun contributed only a third part to the compilation of the new geography, its success was mainly to be attributed to his talent; and the proprietors of the *Journal des Debats*, from the celebrity he had acquired by this publication, earnestly solicited him to become one of their Editors.

To his intimate acquaintance with the principal languages of Europe, to his knowledge of the individuals composing foreign cabinets, and the various interests which directed them, to the faithfulness of his memory, to the accuracy of his judgment, to the variety of his information, to the facility with which he combined the materials scattered through a mass of foreign journals, he owed that minute accuracy that distinguished his articles on foreign politics. Having become more

familiar with our language, he exercised himself on every variety of subject. His contributions to the *Journal des Debats*, on voyages, geography, history, languages, antiquities, physical science, morals, and literature—articles not confined to simple analyses, but forming appropriate dissertations on the works which he reviewed, compose a miscellany at once interesting and voluminous.

At that period when France, seduced by the folly of her kings, and the intrigues of English policy, into conquests which she had no desire to achieve, was preparing to establish in Poland a barrier to secure Western Europe against the preponderating power of Russia, Malte-Brun conceived the design of bringing this country into notice, a country which had twice fallen a sacrifice to iniquitous power, and which, divided between two of its natural allies, no longer possessed a geographical existence. The interest which the Poles excited secured a favourable reception for the "Tableau de la Pologne," a work which, although it cost the learned geographer only six months' labour, contains a rapid sketch of the geography, history, manners, and resources of its ancient territory. "A description of Poland," says he, in his preface to this work, "has been till now an object of unfulfilled expectation. We have made some researches with a view to fill up this blank in geography. The interest excited by actual circumstances has induced us to publish the result of them, though very imperfect. It is without presumption, and influenced solely by sentiments of friendship and esteem for the Polish nation, as for a faithful ally of Denmark, that a Dane has presumed to give some little information respecting Poland. He merely presents to the learned Poles a simple sketch in order to excite them to fill up the outlines by new researches. Let our anxious desire for the welfare of Poland be our apology, if we have fallen into errors which we could not avoid."

It was in 1807, a year fruitful in glorious events, when our armies braved the rigours of winter in pursuit of the Russians, even to the marshes of Polish Prussia; when Napoleon carried his victorious arms to Eylau, and gained the memorable battle of Friedland; when Dantzick opened its gates, Konigsberg capitulated, and a long series of brilliant achievements terminated by the interview of Tilsit and the erection of central Poland into the duchy of Warsaw; when the noble devotedness of the Poles, and their attachment to France, was rewarded by the gift of a phantom of a country, and when Lithuania, and the other provinces, formerly Polish, only waited for a signal to proclaim their independence;—it was in the midst of this tumult of arms and political intrigue that the Tableau de la Pologne made its appearance. It met with the same reception in France as all the other works of the author; but in 1812, the entrance of our armies into the Russian territory again attracted attention to this book; the Poles saw themselves on the point of being reinstated among the number of free nations; it was thought that the French warriors would be desirous of reading on the spot a book which, giving an account of the ancient power of the Poles, ought to excite the interest of their deliverers; speculators thought it a favourable occasion for collecting at Wilna all the French works relative to Poland; that of Malte-Brun was among the number; but on the conclusion of a campaign, the result of which, although the fate of arms was always in favour of the French, till the frosts of winter mowed down their ranks, was the disastrous retreat of the French and the capture of Wilna by the Russians, the latter hastened to destroy those books favourable to their enemies, and the Tableau de la Pologne, being entirely destroyed in consequence of this event, made it necessary that its author should publish a new edition,* which he was on the point of doing when death overtook him.

* The Tableau de la Pologne has been recently reprinted with numerous additions and important corrections, for which we are indebted to M. Leonard Chodzko, a young Pole, who, in publishing this edition in 1830, seemed to foresee that the energetic struggles of his countrymen were about to settle the question of their liberty or slavery. The title of the new edition is: "Tableau de la Pologne, ancienne et moderne, sous les rapports geographiques, statistiques, geologiques, politiques, moraux, historiques, legislatifs, scientifiques et litteraires;" published in one volume by Malte-Brun. New edition, entirely remodelled, enlarged, and illustrated with maps; by Leonard Chodzko, formerly student of the university of Wilna, member of the royal academy of Nancy, &c. 2 vols. in 8vo, Paris, 1830.

Let us for a moment retrace our steps: it was in the course of the year 1808 that Malte-Brun executed the plan which he had conceived, since his entrance on the pursuit of the sciences, of contributing to diffuse the taste for geography in France, by the publication of a periodical especially devoted to this important branch of human knowledge. He, with justice, attributed the superiority of Germany over France in geographical knowledge to the number of collections in the first of these two countries, and to the total want of them in the second. He then published, in concert with M. Eyriés, the Annales des Voyages, de la Geographie, et de l'Histoire; and thanks to this successful attempt, we now possess several periodical works on geographical science.

The publication of these Annales, and his co-operation in the editorship of the Journal des Debats, did not prevent Malte-Brun from finding time to erect that monument to geography which he proposed to leave as his most durable title to scientific and literary reputation; we allude to the "Précis de la Geographie Universelle." The first volume of this work appeared in 1810. It contains the History of Geography, a history which may be considered as a separate work, forming a brilliant introduction to the history of the science. We have scrupulously respected the plan and execution of it, only introducing those corrections and additions which have become indispensable in a work published more than twenty years ago.* The second volume contains the Theory of Geography in general, namely the astronomical and mathematical, the physical and political parts. He gives an exposition of the changes which have affected the surface of the earth, details of the geographical distribution of vegetables and animals, and considerations on the physical state of man. It was in 1817 that the fifth volume of the Precis appeared, and such was the success of the work, that although the impression was a large one, all the volumes required speedily to be reprinted. Persuaded in 1811, when he commenced the descriptive part, that the enormous extent to which the French empire had attained would lead sooner or later to important modifications in the limits of the different states of Europe, Malte-Brun had left that quarter of the world to be last treated of, taking up in succession Asia, Oceanica, Africa, and America. These expectations were realized; after the defection of her allies, in 1814, the preponderating power of France was humbled, and her territory confined within limits which Napoleon would not and could not recognise.

Malte-Brun had, like many others, been lavish of his praise on this extraordinary man, whose only reproach was, that he had attempted to forge chains for a generous people, as eager for glory as for liberty. Louis XVIII. perceived, that after an absence of twenty-five years, the princes of the ancient dynasty, unknown to the youthful portion of the nation, could derive no solid support from that numerous body of the people that demanded institutions based on the abolition of absolute power, and on a true national representation; he was therefore anxious, in returning to France, to proclaim a constitution, the faithful administration of which should efface the remembrance of a military despotism, and ensure the prosperity of the country. Malte-Brun, seeing a government about to be established in France, the advantages of which he had so long proclaimed in his own country, readily embraced the cause of the Restoration; and although the government of Louis XVIII. was guilty of errors which paved the way for the 20th March, and which were also publicly confessed by the King, the conscientious geographer, better informed than any other man on the probable course of events and the general tendency of politics, conceiving besides, from the first acts of Napoleon, that his residence in Elba had not made him more favourable to public liberty, boldly manifested during the Hundred Days his aversion to despotism and arbitrary power, by the publication of *An Apology for Louis XVIII.* He has been blamed by some for this conduct, but we only see in it his

* This biography was originally prefixed to a new edition of the first volume (Histoire de la Geographie) by M. Huot.—P.

hatred of a military government, the infallible results of which have been acknowledged; we only see the consequence of those principles which led him to embrace the party of the Restoration; we regard it as an act of courage worthy a man of independent spirit, and deserving of eulogium. He was actuated by similar motives when he published, in 1825, *A Treatise on Legitimacy*. He perceived that at the period when Louis XVIII. terminated his career, other parties would advance the same pretensions. Distrust in Charles X. had already begun to manifest itself; and his object was to prove that legitimacy was a fundamental principle, as indispensable to the liberty of the people, as the preservation of the powers constituted for the defence of society. In this his intentions were wise, and his reasoning just, but he did not see that by referring legitimacy to divine right, he placed it on a foundation of which history has too often demonstrated the weakness. If he had witnessed the revolution of 1830, he would have perceived that true legitimâcy derived from the sovereignty of the people, and expressed by general consent, is sufficient to establish, on a permanent basis, the order of succession to the throne.

Towards the close of 1821, Malte-Brun acquired another title to the gratitude of the learned by lending his active co-operation to the establishment of the *Société de Géographie*. He was one of the original founders of this association, and one of the compilers of its statutes, in which are laid down the most certain methods of attaining permanent success. Recalled to that science to which he was so ardently devoted, and from which his attention had but too often been diverted, he published in 1825 the sixth volume of his System. This volume contains a general view of Europe, and a classification of its inhabitants, ancient and modern, into families and languages, the description of Turkey, Hungary, Russia, Poland, and Galicia. Its appearance created a pleasing sensation in the literary world, and the termination of the book was anxiously hoped for. It had now been fifteen years in progress, and its increasing reputation among the learned of Europe has been faithfully expressed in the following extract from an eloquent address by M. Larenaudière on the labours of the Society of Geography, and for the irreparable loss which it sustained in 1826 by the death of several members, especially that of Malte-Brun.

"The description of the earth," says he, "is a vulgar work, if confined solely to a classification of observed facts. This is not geography according to the idea of Strabo, nor is it that of Malte-Brun. He felt that uninteresting detail is the result of abstract method, and he avoids it in his geography, a science from which it was considered till then as inseparable. He triumphs over the difficulties which he encounters in particular description, by sound judgment and graphic powers of delineation. Combining, with address, the natural arrangements with the political divisions, he unites under one point of view the tribes of a common origin; and when there is no such link of connexion, he includes provinces and empires in the bounds traced out by nature. Like her, his progress is picturesque and varied, and his arrangement changes with his subject. If he advance into a country well cultivated, he gives an accurate description of its fruitful soil. Does he enter upon the desert or into mountainous regions, he confines himself to the physical aspects of the country. He has the art of giving a charm even to dry topography, by mixing with the enumeration of cities in the order of their importance, historical sketches and scenes from domestic life. At other times, he sails from shore to shore, beguiling the peaceful voyages with profound discussions on comparative geography. In passing through powerful nations, he discloses the causes of their prosperity, the phases of their greatness, their natural resources and their political interests; and when he approaches savage nations, his vivid pencil, with astonishing facility and truth, portrays the manners, the costume, the physiognomy and the habits of the men of nature. Above all, in addressing the intellect, and the imagination, he places on philosophical bases a science too long despoiled of its true character, and

its natural charms. This is not the sketch of his geography, but of his mind, his ruling thought, the great features which distinguish him, and which explain the success of such a composition, and its influence on the manner of treating geography."

Malte-Brun was one of those men to whose existence employment is indispensable, because they wish to know every thing, and to judge of every thing for themselves; their life is a continuous study. How great must have been the erudition which enabled him to compose the first six volumes of his geography, which a distinguished writer styles a kind of Encyclopædia. The plan of this work is without doubt too vast for one man to execute, without leaving some parts weak; still no part has been better done to this day. To raise an imperishable monument to geography, and to fix the state in which it was found at the beginning of the nineteenth century, Malte-Brun should have called to his aid coadjutors, to each of whom he should have intrusted a branch of the science, reserving to himself the description of the countries with which he was best acquainted, and the general superintendance; but he has charged himself with the weight of the universe, under which even Atlas stooped.

In the course of the two last years of his life, Malte-Brun had prepared and arranged some materials for the publication of an abridgment of his geography. He published in the course of June 1826, under the form of a prospectus, the preface, in which he traced, in a clear and precise manner, his plan, which was entirely new.*

The constant and harassing fatigue attending his laborious employment, at length exhausted his strength; his friends saw with sorrow that his health was declining; a repose of a few weeks might have established it, but he neglected the counsels of prudence and the solicitations of friendship. His disease soon made frightful progress, and while those around him were fearful of the issue of the alarming malady, he alone was calm and ignorant of his condition. For three days he had determined on confining himself to his room, but absorbed by his passion for science and the intensity of his desire to be useful, he sketched two hours before his death, the Analysis of a scientific work for the *Journal des Debats*. It was on the 14th December 1826, that an attack of apoplexy suddenly carried off from his disconsolate family, from his numerous friends, from the young students of science and literature whom he guided by his counsels, him whom they expected to see seated by their side in the academic chair.

How great would have been his regret had he foreseen that he should be cut off before finishing the work which he regarded as his best title to renown, as that alone which should open to him the gates of the institute. He had only prepared the first five or six leaves of the seventh volume when he ceased for ever from his labours.

Called to continue the system of geography of which we have composed the two last volumes, who can appreciate better than we the facility with which Malte-Brun wrote, and the memory with which he was endowed, for, after having thought, like all his friends, that he had left abundant materials for this great work, we have ascertained the contrary. It appears that all his work was prepared beforehand in his own mind; he consulted only the statistical details in the German journals or different foreign geographies.

After having been carried to the protestant church of the confession of Augsburg, his mortal remains, surrounded by a crowd of friends, of men of literature and science, of booksellers and journalists, were carried to the cemetery of the West; his coadjutor M. Eyriés, and his old friend M. de Larenaudière, expressed their grief and deep sorrow over his tomb.

* Notice Annuel des Travaux de la Societé de Geographie en 1826, par M. Larenaudière, secretaire generale de la commission centrale.

Now that the name of Malte-Brun, for ever celebrated in science, reflects a lustre on the nation that can claim him as her own, is it Denmark or France that is entitled to this honour? In vain shall we be told that he never openly renounced his Danish citizenship; we would answer, that the unjust severity with which his native country has punished by a banishment of twenty-six years the disinterestedness and spirited efforts of a young patriot has deprived Denmark of the right to reclaim him. What! is it in 1826, is it when death was about to snatch him from the world, that the country which gave him birth recalls him whom she had spurned from her bosom!

D'Alembert vouchsafed the kindly name of mother only to the poor woman who picked him up in the street, and brought him up as her own son; so has not Malte-Brun tacitly renounced the country which expelled him, and transferred to France, which adopted him, all the feelings due to his native country? Let us not hesitate then to honour him as the organ of certain political and literary opinions,—as the author of one of the most important French works; indeed, this great geography ought to rank with the works of our most distinguished authors.

THE

AUTHOR'S PREFACE.

THE design of the present Work is, to bring together in a series of historical discourses, the whole of Ancient and Modern Geography, in such a manner as to leave in the mind of every attentive reader a lively picture of the whole terraqueous globe, with all its different countries—the memorable places which they contain—the tribes of men by which they have been successively peopled, and those which at the present moment are its inhabitants. It appears an immense undertaking, when we consider how many varied details require to be combined in a work of moderate size. It might even appear rash in its nature, when we contemplate the characters of the different subjects embraced in it—subjects which have usually been consigned to erudite rather than to elegant pens, and have been regarded as susceptible of no brilliancy of literary composition, or depth of philosophical remark.

The diffidence which the prospect of so many difficulties naturally creates, has, however, yielded to a thorough convic tion, that the science of geography admits of being made very different from what it now is. We have thus reasoned: Is not geography the sister and the rival of history? If the one enjoys the empire of universal time, does not the other rightfully claim that of place? If the one has the power of recalling past generations, should not the other exert that of fixing in one scene the shifting pictures of history, by delineating to the mind the permanent theatre of the poor and brief transactions of mankind, strewed with the wrecks of numerous empires; and describe the course of nature, constantly occupied in repairing, by its beneficial operation, the ravages arising from human discord? Does not a description of the globe intimately connect itself with the study of human nature, human manners, and human institutions? Does it not offer information of the utmost importance to the political sciences? Is not this department always brought fully into view before a complete form can be given to any branch of natural history? And does it not supply literature with a boundless treasure of feelings and of images?

These considerations have cherished in our minds the hope of raising for geography a monument not unworthy to rank along with the pleasing compositions by which history has been adorned. Many long years would indeed be requisite to confer on such a work that degree of perfection which it is natural to desire. In publishing it in a state short of this, we find ourselves excused by the urgent demands made on us for a "Treatise on Geography." The attempt now laid before the public will, we hope, with all its imperfections, satisfy the wishes of those who complain that there is an absolute want of a work by which geography may be learned, without the risk of contracting a permanent disrelish for this branch of instruction.

We presume to trust that our compend may be qualified to serve as a guide to any professor who is ambitious of teaching geography in a profitable manner;—that in the more advanced seminaries it may be put into the hands of pupils;—and that it will not be an unacceptable present to adults, who have long passed their period of tuition, and wish to acquire instruction by private reading.

It is the Author's most ambitious wish, that his work may obtain the suffrages of those real philosophers, who, in every science, set even less value on its useful economical results, than on the intellectual enjoyment and the improvement which the study of it implies.

The following is the arrangement of the present work: It will begin with the general theory of geography, consisting of its Mathematical, Physical, and Political principles.—From astronomy we shall borrow the requisite information, respecting the figure, size, and motions of our planet; from geometry, the views which are most necessary for understanding the art of representing, in small plans, the exact form of the lands and the seas: we shall explain the method of determining the actual distances of places, and comparing with one another the measures employed in different countries.

Proceeding next to the physical picture of the globe, we shall take a view of the leading features of nature; the mountains which diversify the surface of the land, the seas which bound its outline, and the rivers and the valleys by which it is intersected. We shall seek our way downward, through caverns and through mines. We shall direct over the brink of the volcanic crater an eye of interest and curiosity; and thus do our utmost to explore the structure of the globe. After inquiring into the motions of the atmosphere, and the laws of temperature, we shall distribute into their native regions the animals, the plants, and all the beings that are nourished in the exhaustless bosom of the earth. We shall conclude the picture by considering man in his natural and in his political condition. We shall classify the races of our species according to the varieties which are marked in their bodily appearance and character—according to the languages which they

speak—according to the creeds by which their minds are consoled, or degraded and enslaved—and according to the laws which mark the progress of civilization, or the profound darkness of utter barbarism.

What revolutions has the terrestrial globe undergone? This is a question which equally interests the history of man and that of nature. But is it a question which enters into the science of physical geography? is it a question which, in the present state of our knowledge, we can profitably discuss? We shall not certainly undertake to resolve the problem, or series of problems, which it implies; but we shall present to our readers a view of the leading facts which geologists employ to construct their brilliant, but empty systems.

This philosophical theory of geography will occupy the first volume of our work. The others, with the exception of one, will be devoted to a successive description of all the parts of the world. In that department we found it necessary to engage in long meditation, and in weighing opposite considerations, before we could invent and fix upon the method which would unite the greatest degree of solidity with the most agreeable manner. An order purely geographical must apparently have destroyed the political and moral connexions of the different portraits which we had to present. An order purely political would have injured the physical delineation of the mountains, the seas, the rivers, and the climates. The great desideratum was, to reconcile, in some measure, with each other these two rival methods. For this purpose, our mode of procedure must be varied according to the character of the obstacles presented on different occasions, and the difficulties which they create in following chiefly or exclusively one or the other of these two methods. In introductions prefixed to particular departments, we must give a sketch of the general features which a large division of the world possesses in common. We must place a view of the Alps in front of our description of Europe, and a view of the Cordilleras at the beginning of the division appropriated to South America. Do we find some nations which are politically separate, united in their origin, in their language, or in their history?—we must collect them into one group, and survey them from one point of view. We must endeavour every where to form our subject into natural masses, easily embraced under one regular vista. Small states must be combined into natural groups; the provinces of great empires must be distributed in conformity with the direction of the mountains and the rivers; and the comparisons formed between the different divisions must not be permitted to encumber the current of our discourse, but reserved for exhibition in the form of synoptical and analytical tables.

Besides our general arrangement, it was necessary to find out the particular method best suited for the description of each country. After examining all the classifications which authors have given of the objects of special geography, we have found that a too rigorous adherence to these abstract methods has been the real cause of the pedantic dryness attached to books of geography. From this empty technical parade of science, geography, which ought to be a living picture of the universe, has been converted into the gloomy anatomy of a great subject in a dead and dismembered state. Thus it has been held in dread by the young, neglected by the learned, and scorned by the multitude.

From these considerations it has appeared our duty to follow the general principles of the art of writing, and, by varying according to the nature of the subject, not only the tone but the order of our descriptions, we have endeavoured to contrive for the delineation of each country, a particular scale suited to the relative size and importance of its objects. Where one presents the spectacle of a smiling cultivation, we give a careful detail of its different productions. Where it is uncultivated, we draw an outline of the character impressed on it by nature. At one time, in an imaginary tour, we give an easy enumeration of the towns of the interior. At another, in the character of fire-side navigators, unfettered by the dread of contrary winds or dangerous currents, we proceed from harbour to harbour, and from island to island. Does a particular nation act a leading part in the civilized world?—we discuss its powers, its resources, its interests. Is it a savage horde that engages our notice?—we take an interest in depicting its manners and mode of living.

Our choice of the towns and remarkable places on which we dwell, will be determined sometimes by degrees of political importance, sometimes by historical celebrity. We shall sometimes, in passing, take the liberty of discussing a point of critical geography, resolving a doubt, or correcting an error. We shall not even scrupulously deny ourselves and our readers the pleasure of occasionally mingling our topographical descriptions with passages of history, or with anecdotes tending to illustrate manners, and often serving to fix in the memory names of localities, which otherwise it would be difficult to retain. There is no reason why we should refuse to pick up a flower which obtrudes itself on our view. A description of the world should resemble the world itself, in which the most arid deserts present here and there a limpid fountain, or a refreshing shade.

From fifteen years of geographical reading and study, we have been fully convinced that this free and animated march is that which will enable geography to give the surest access to the sanctuary of historical knowledge, which never could be afforded by any of those rigid abstract methods which are applicable only to the mathematical sciences. Our object is to write an agreeable and useful book, not to draw up an extended table of mere contents.

Adopting this plan for our "Universal Geography," we are far from denying the merits of methods different from our own. Let a new Varenius, in a purely mathematical geography, employ all the resources of the higher geometry; let another Bergmann discuss, in the language of chemistry and of natural history, the elements of an improved physical geography; let naturalists subdivide physical geography itself into branches corresponding to particular sciences, as the geography of plants, of minerals, and of animals; let the pupils and successors of Busching collect, with indefatigable patience, the materials of chorography and topography, the object of which is to give a particular description of each country, each

canton, and each town; let them display, in immense columns of numbers, the details of that branch of political geography which is called statistics. Let others of the learned explore other parts, such as that of forming a Critical Comparison of the old geographers; or, the History of Voyages and Travels. Nothing is more useful to science—nothing more deserving of the esteem of the learned world, than labours thus consecrated to a single object. Nothing is more laudable than to give to each of these branches the most rigorous and scientific form which its particular nature will admit of. We have already shown some zeal in collecting, announcing, and appreciating labours of these different kinds, in our periodical work, entitled, *Annales des Voyages, de la Géographie et de l'Histoire.** But, as a universal geography cannot, without swelling to an undue extent, embrace all the details of every branch of geographical science, we must here content ourselves with gathering the flowers and the fruit of these learned discussions and laborious researches.

There is another view of the subject which we wish to lay before the readers of our work. The mathematical and physical principles of geography are immutable; but the state of human knowledge is variable, both in the materials furnished, and in the use which the mind is, at different epochs, qualified to make of them. Nations are extinguished, kingdoms destroyed, cities laid in ruins, and at last every trace of their former existence is effaced. We may therefore suppose a series of geographical works, each of which, though quite different from those which precede and follow, may be correct and complete for the year or the age to which it belongs. Under this point of view, custom has in some measure sanctioned a threefold partition of the science. "Ancient geography" comprises all that precedes the 500th year of the Christian era, or the great migration of nations. The "geography of the middle age" extends from that period to the discovery of America; and this point begins the region of "modern geography." But if the subject were to be expressed in rigidly philosophical language, we should be obliged to make a distinction of geographies, corresponding to the number of nations and of ages. Each of these may be considered as a separate body of knowledge. They are indeed imperfect and erroneous systems, compared with that of the present age; but it is interesting and important even for mere amateurs, to have an idea of the slow progress, and sometimes retrograde course of the science, in so far as that progress is known to us with certainty. We shall therefore accompany the present work with an "Outline of the history of discoveries, and of geographical systems." We shall first take up this science in its cradle. Moses and Homer present us with a picture of two of the most ancient nations. Soon after this, the Phœnician sailor, guided by the light of the stars, traverses the Mediterranean, and discovers the Atlantic Ocean. Herodotus relates to the Greeks what he has seen and heard, concerning different nations and countries. The extensive colonial system of Carthage, and the adventurous voyages of Pytheas of Marseilles bring the western world into view, and create conjectures respecting the north. The military glory of Alexander throws a brilliant light on the countries of the east. The Romans inherit the greater part of the discoveries made by the polished nations of antiquity. The Eratostheneses, the Strabos, the Plinies, and the Ptolemies, arrange the materials still obscure and incomplete. Next comes the great migration of nations, to overturn the whole edifice of ancient geography. It was by losing their ascendency that the Greeks and Romans learned how much more extensive the world was than their systems had represented it. The chaos thus produced, gradually gives place to regularity; and, with the rise of modern Europe, the elements of a new geography are formed. The spirit of travelling revives. It had already conducted, without profit, the Arabs to the Moluccas, and the Scandinavians to America. No science accompanied these people, to gather the fruit of their bold undertaking. Equally courageous, and better informed, the Italians and Portuguese, by the help of the magnetic needle, navigate the high seas with confidence. On every hand the barriers raised by prejudice, which contracted the horizon of geography, fall in pieces. Columbus now conducts us to a new world. By sea and by land, every nation emulously enters on the career of discovery; and, by their united efforts, the vast theatre of the globe, notwithstanding some partial shades, is now finally opened to the gaze of science.

This forms a subject which demands much perusal of old geographical works, and much attention to various ancient histories; but it cannot, in the eye of the general reader, be entitled to such a full description as the state of modern geography.

Even modern geography must be restricted within certain limits, which, without reducing it to a dry unmeaning nomenclature, will avoid the error of confounding it with other sciences. Intelligent minds, no doubt, often delight to bring together under the same point of view the results of sciences the most different from one another in their origin and progress, as well as in the nature of their objects. Geography, like history, certainly ought not to be blamed for taking an interest in every thing that influences the fate of nations and of empires. It must also be granted that she confers, in her turn, a benefit on other sciences, by bringing their discoveries into notice, in order to place them in a new light. When political economy, for example, weighs in her balance the powers of a state, when she ascertains the existing relation which the superficial area of each canton bears to the number of its inhabitants, the results of these laborious inquiries may often be of such a nature as to interest history. In the same way they may also interest geography. Such dry truths, when arranged in tables of political geography, acquire a lustre and an interest from the great geographical views with which they are associated. This species of interchange gives life to the whole republic of science and of literature. But the different regions of which that republic consists, have each its own language, its constitution, its separate interests. These objects

* Annals of Voyages, Geography, and History

are not to be confounded. Every discussion in politics, in religion, in morality—every research in history, chronology, or antiquities, which does not bear a direct reference to geographical changes—every calculation of the higher geometry—every superfluous quotation of the principles of chemistry or of physics—every detail in natural history which does not admit of any other description than the technical explanations of the naturalist, and which forms no essential feature in the physical picture of a country—is to be considered as foreign to a good universal geography, though entering with great propriety into special treatises on mathematical, physical, or political geography.

Our science, when disencumbered of all that diversity of foreign matter, is still a subject of vast extent; and to an author desirous of exhibiting it in an advantageous light, it presents thorns and difficulties in sufficient number. When we have read, compared, and formed a judgment on all the accounts given by travellers of every nation, accounts often false, and often unsatisfactory, when we have analyzed an immense multitude of travellers' journals, astronomical observations, dissertations, descriptions, and notices, enumerations and official statements, together with the estimates and calculations made by individuals; when we have, with much labour, searched out geographical documents lost in memoirs of natural history, in monographs of medical, mineralogical, or botanical topography, often even in commercial almanacks and political journals;—we have not yet done all that is required. Much remains to be brought to light that lies hid in the archives of governments, or buried in the portfolios of individuals; and much knowledge which is even openly exhibited in the great book of nature, but has not yet found an attentive observer, requires to be discovered by original observations.

Since geographical knowledge, like every thing of a historical nature, is derived from many sources, varying in their degrees of authenticity, it is indispensably necessary, in order to satisfy the inquiring reader, to give the names of such sources as have been consulted. The learned will thus judge what degree of credit they ought to repose in each instance. It is also an act of literary justice to make our readers acquainted with the names of those who have served as our masters and guides; names which to many will thus become known for the first time. Influenced by these considerations, we have at the bottom of each page given a reference to the principal passages in other authors, (generally original, rarely compilers,) on which our assertions are founded. At the same time, we have rigorously avoided such foot-notes as are injudiciously lavished in many learned works. None of our references will force our readers to make a halt. While one who is critically curious, may, by means of them, bring our accuracy to the test, or obtain the means of extending his information on particular parts of our subject, another, whose object is to obtain as much interesting information as possible in the easiest manner, may peruse our work without suffering himself to be in any degree impeded by the references.

SYSTEM

OF

UNIVERSAL GEOGRAPHY.

BOOK I.

Theory of Geography. Of the Earth, considered as a celestial Body, and in its relations to the other celestial Bodies. Of Latitudes and Longitudes.

In exhibiting under one view the actual state of the science of Geography, the statement of general truths ought to precede the detail of particular facts. We shall therefore consider our planet in relation to its dimensions and physical structure, before entering upon the study of the different countries which cover its surface.

It belongs to astronomy to exhibit to our view the earth balanced by its own weight in the immensity of space, revolving, with all the other planets, around the resplendent luminary, which distributes to each of these celestial globes its portion of light and heat. It belongs also to astronomy to ascertain the laws which govern the *solar system*, and to trace the orbits of the different bodies which compose it; of *Mercury*, lost in the rays of the sun; of *Venus* and of *Mars*, in the neighbourhood of our earth, but which are not attended by any *moon* or satellite; of *Vesta*, *Juno*, *Ceres*, and *Pallas*, which are so closely connected with each other; and lastly, of *Jupiter*, *Saturn*, and *Uranus*,[a] each surrounded by a magnificent train of satellites, or *secondary planets*. It is still farther the business of the astronomer, to demonstrate that the magnitude of the sun is 1,384,462 times greater than that of our planet, which in this respect is in like manner surpassed by Jupiter 1281 times; by Saturn 995 times; and by Uranus 80 times; while all the other planets are inferior to it.[b]

As geography exclusively is our province, it is sufficient for us to borrow such notions belonging to astronomy, as are necessary for comprehending the terms employed in reference to geographical maps, and for conceiving the truth of the methods used in constructing these representations of our globe.

The spherical form of the earth is the fundamental principle of all mathematical geography. The proofs of this truth present themselves to the senses.[c] The phenomena of the heavens discover it to us; terrestrial appearances also render it obvious. We shall begin with the latter.

Were we placed in a vast plain of Arabia, or on the surface of the ocean, no mountain would there intercept the objects situate within the range of our vision. Why then do we not see elevated objects only diminish in apparent magnitude, as they recede from our view, without any portion being hid; as would certainly be the case if we were upon the same horizontal plane with them? Why do towers, vessels, and mountains, when we recede from them, appear to sink below the horizon, commencing with the base? and why, on the contrary, when we approach them, do these objects show first their summits, and thereafter their middle, and last of all their lower parts? These phenomena, which every one has an opportunity of observing, prove evidently that every apparent plane upon the earth is a curve surface. It is the convexity of this surface which conceals from the eye of the spectator, upon the beach, the hull of the vessel of which he sees the masts and sails. But since we know that these things happen uniformly towards whatever part of the earth we travel, whether towards the east or towards the west, towards the north or towards the south; since we find that this assemblage of curve surfaces is no where sensibly interrupted, it is impossible to avoid drawing the conclusion, that the whole surface of the earth is, on all sides, nearly regularly curved; or, in other words, that the earth is a body approaching in figure more or less to a sphere.

The object at which the first observers of the stars aimed in their researches was, without doubt, to find certain guides in the voyages which either curiosity or necessity prompted them to undertake. They remarked that the sun, their first guide, occupied, in the celestial hemisphere, a place opposite to certain stars, which every night were constantly visible over their heads, while other stars disappeared and re-appeared alternately. Their attention was particularly attracted by the

[a] Herschel.—P.

[b] See, in the Sequel of this Book, the *Synoptical Table* of the solar System. Consult *Laplace*, Exposition du Système du Monde; *Biot*, Astronomie Physique.

[c] *Varenius*, General Geography revised by *I. Newton*, b. I. sect. ii chap. 3. *Maupertuis*, Elements of Geography, chap. 2.

pole star: they marked this point in the heavens, which, itself alone immoveable, appears to serve as a pivot, or, according to the Greek expression, as a *pole*,[a] to the apparent motions of the heavenly bodies. They next traced a *meridian line*, that is, a right line in the direction from the sun at noon to the pole star; and however imperfect this first operation may have been, it was sufficient to mark out to them the four quarters of the world, usually denominated the *cardinal points*. Now, if they proceeded towards the north, they saw the pole star take a position more elevated in the heavens, with regard to the circle which on all sides bounded their view, and which is named the *horizon*.[b] Did they go towards the south, this same star appeared to sink, and others, before invisible, appeared successively to rise. It was therefore impossible that the line whose direction they followed, could be a straight line traced upon a horizontal plane; it could only be a curve, an arc of a circle, to which corresponded another arc of an imaginary circle in the heavens. But as the same changes of the horizon had every where taken place, it was natural to conclude that the earth had at least a circular form from north to south.

It was without doubt by some such reasoning that Anaximander, and some other of the ancient philosophers, were led to regard the figure of the earth as *cylindrical*.[c]

Astronomical observations, by being multiplied, were rendered perfect. The motions of the heavenly bodies were calculated from fixed epochs; and the periodical return of eclipses was determined. It was then easily perceived, that the sun rises sooner to those who dwell more towards the east, and gradually later to others in proportion as they are removed to the west; for if an eclipse of the moon is observed at Paris and at Vienna, and if this eclipse begin when it is ten o'clock at night at Paris, it will be near eleven o'clock at Vienna before its commencement is observed; so that the sun must rise sooner to the inhabitants of Vienna, than to those of Paris. This, however, could not happen unless the surface of the earth were curved from east to west; for were it flat, the sun would begin to illuminate all parts of the face of it at the same instant.

Lastly, when by a series of observations, we are fully convinced that the eclipses of the moon are caused by the conical shadow of the globe of the earth, we have a complete confirmation of all the preceding proofs in favour of the rotundity of the earth; and we see at the same time, that the globe of the earth is not subject to any great irregularity; since, in all possible positions, its shadow upon the disk of the moon is found to be terminated by an arc of a circle.

The numerous voyages which have been made round the world, have finally shut the mouths of all those who persisted in regarding the earth as a round plane, or a hemispherical disk. Navigators, such as Magellan and Drake, sailing from Europe, have pursued a course always towards the west, (making only some deviations, in order to double the lands which stretch towards the south;) and without quitting this general direction, have returned to the same place whence they set out. Upon a circular plane we might indeed perform a circular voyage, but that by continually changing the direction *Heemskerk*, when he wintered at Nova Zembla, confirmed what astronomers had concluded from the spherical figure of the earth;—namely, that the days and nights near the poles extend to several months. Finally, *Cook*, in approaching as near as possible to the southern polar circle, found that the voyage round was always diminished proportionably to the diminution of his distance from the pole; so that we have thus obtained an ocular proof of the rotundity of the earth towards the south pole, as well as towards the north.

So many united proofs, as well as the accuracy of so many astronomical observations, all of which have been made and calculated upon the supposition of the sphericity of our earth, leave no room for reasonable doubts upon the subject. Respect for the Sacred Writings, which, in speaking of the earth, employ expressions borrowed from ordinary language,[d] ought not to induce us to reject a physical truth altogether foreign to the moral truths which religion teaches. In vain does ignorance demand of us how the earth can remain suspended in the air without any support. Let us look upon the heavens, and observe how many other globes roll in space. The force which supports them is unknown to us; but we see its effects, and we investigate the laws according to which these effects take place. Let us then lay aside all uneasiness concerning the *antipodes*, that is, the people of the earth whose feet are turned towards ours: there is upon the globe neither high nor low; the antipodes see, in like manner as we do, the earth under their feet, and the sky over their heads.

What would we gain by supposing, as Homer does, that under the earth are placed a range of columns guarded by Atlas, or by imagining it to rest upon nine pillars, as the Scandinavians believed,[e] or upon four elephants, according to the opinion of the worshippers of Bramah? Upon what would these elephants or these columns rest? Our thoughts, however far they proceed, must always at length stop short, and, affrighted, recoil from that infinity which surrounds us on every side, and which it is folly to attempt to comprehend. But, some more reasonable observers will say, Do not the Andes and the Alps make it evident that the earth is an irregular body, and not at all round? We answer: The highest mountain known, which is Chimborazo in Peru, rises to 21,424[f] feet above the surface of the sea. This[g] height is nearly $\frac{1}{600}$ of the earth's greatest circumference, and $\frac{1}{1000}$ of its axis. Upon an artificial globe of twenty-one feet in circumference, or of $6\frac{2}{5}$ feet in diameter, Chimborazo could only be represented by a grain of sand less than one twentieth of an inch[h] in thickness. Irregularities so imperceptible do not deserve to be taken into

[a] Πολος, a pivot, from πολειν, to turn.
[b] From δριζειν, to bound, to circumscribe.
[c] *Arist. de Cœlo*, lib. ii. cap. 13.
[d] Psalm xxiv. 2. xxxvi. 6. Comp. *Lactant.* l. iii. ch. 24. *Augustin*, De Civ. Dei, XVI. 9.
Voluspâ, stroph. 2.
"Nio mân ek heima
"Nio *ividi*."

[f] Or about 6531 French metres.
[g] It has since been discovered, that some mountains in Tibet rise about 5000 feet higher. The accuracy of the data of this admeasurement is, however, dubious.
[h] Half a line, (*une demi-ligne.*)—P.

Fig.1.*P. 11.*

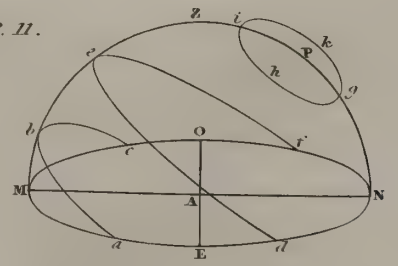


Fig.2.*P. 11.*

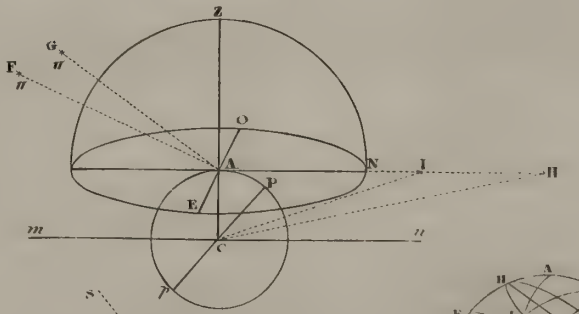
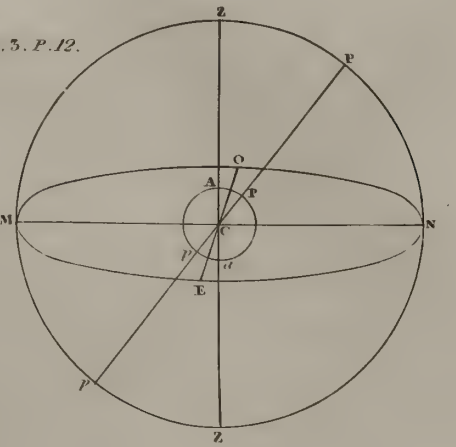


Fig.3.*P. 12.*



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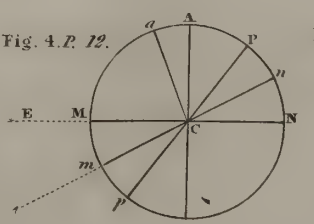
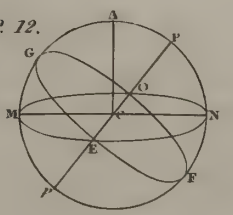


Fig.5.*P. 12.*



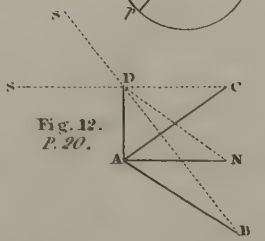


Fig.12.
P. 20.

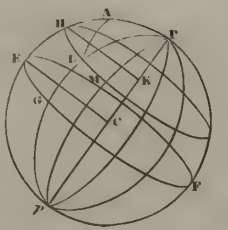


Fig.6.
P. 13.

Fig.7.*P. 13.*

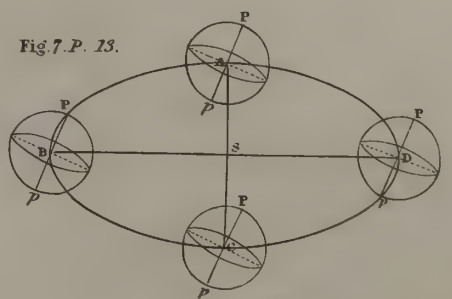


Fig.8.*P. 14.*

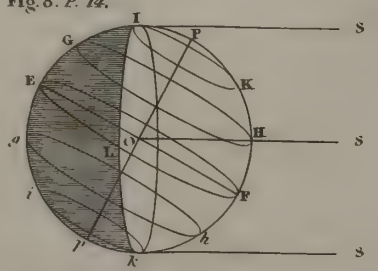


Fig.9.*P. 15.*

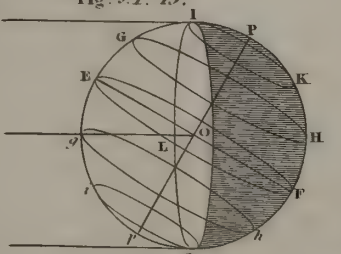


Fig.10. *P. 17.*

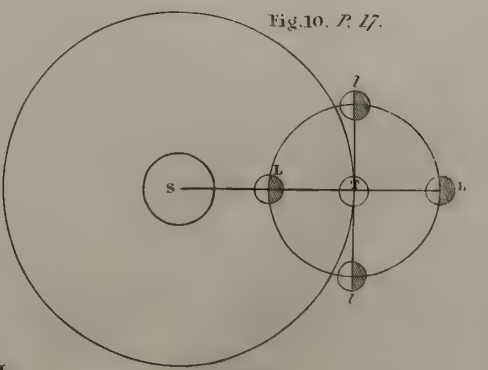


Fig.17.*P. 33.*

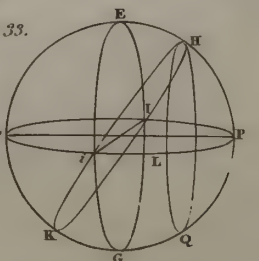
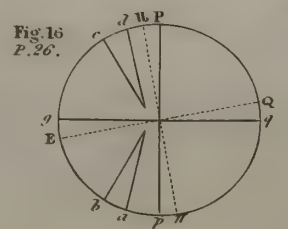


Fig.16
P. 26.



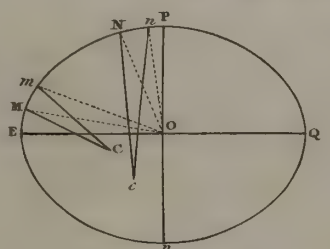


Fig.15.*P. 24.*

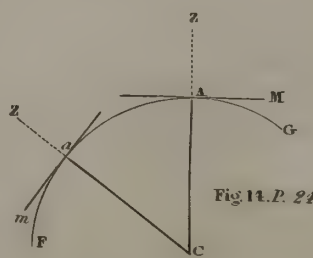


Fig.14.*P. 24.*

Fig.11.*P. 17.*

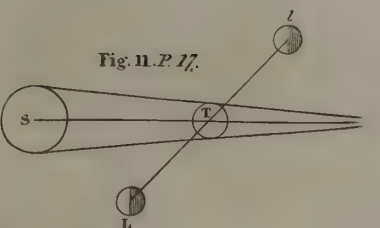
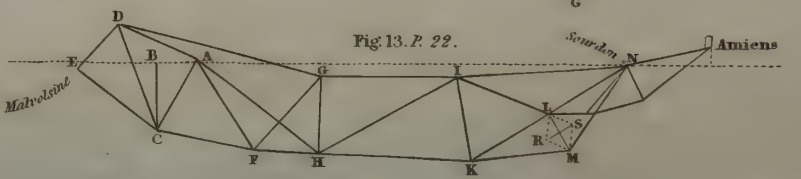


Fig.13.*P. 22.*



consideration. We shall see, in the following Book, that the true differences which exist between our globe and a perfect sphere, are known, measured, and estimated. But before setting forth this result, deduced from observations the most scientific which have been made in modern times, it is necessary to point out more precisely some of the relations which connect this earth with the other heavenly bodies, and to show, according to Lalande and Biot, in what manner these astronomical principles are connected with mathematical geography.

From a simple view, we learn that the stars with which the nocturnal vault of the heavens is bespangled, appear to move from east to west, each describing a portion of a circle. If we observe this motion more attentively, it appears to be performed about a point which alone remains immoveable: this point has received the name of *pole*, which signifies a pivot. The star which is situated nearest to this point, is called the *pole star*. The celestial vault is conceived to present itself under the appearance of a sphere; there must therefore be, in the half which is invisible to us, another immoveable point: this point is the *south celestial pole*, as that which we see is the *north celestial pole*. The imaginary line which passes through these two points, and through the centre of the world, is named the *axis* of the world, from a Greek word which signifies an *axle*. This line passing through our globe forms at the same time its axis, and marks upon the surface of the earth two points corresponding to the poles of the heavens, and which are denominated *terrestrial poles*. That which answers to the pole star, is called the *north pole*, or the *arctic pole*;[a] the opposite pole is named the *south pole*, or *antarctic pole*.[b]

The point of the horizon which corresponds to the north pole, is the north, and the opposite point is the south. The circle perpendicular to the horizon, which passes through these points, and consequently also through the poles, is called by astronomers the *meridian*; it divides the visible celestial hemisphere into two equal parts; so that the stars, at the moment when they appear upon this circle, are at the middle of their apparent course; it is the passage of the sun over this same circle which determines the instant of noon.

We have already spoken of the *meridian line*, or of the line which joins the north point of the horizon with the south. A line perpendicular to the meridian line, and conceived to be extended both ways till it meets the horizon, marks upon this circle two opposite points, each 90 degrees distant from the north and south; and to which are appropriated the names of *east* and *west*.

We may illustrate these definitions upon an artificial globe, or by means of figure 1.

Let the circle NEMO represent the horizon, and the point A the centre, at which the observer is placed; the letters *a*, *b*, *c*, and *d*, *e*, *f*, will indicate portions of circles which the stars appear to describe about the pole. Those stars whose polar distance is not greater than the arc PN, which measures the elevation of the north pole above the horizon, appear to describe complete circles, such as *g*, *h*, *i*, *k*; the point N marks the north point of the horizon, M the south; and consequently MN represents the meridian line. The celestial meridian is represented by the semicircle MZN, of which the plane is supposed perpendicular to that of the horizon NEMO, and which passes through the points M and N. This circle cuts at the points *b* and *e*, the arcs *a b c* and *d e f* into two equal parts. The east point of the horizon is represented by the point E, and the west by the point O: it is from E towards O that the stars appear to move, passing in the middle of their course through some point of the celestial meridian.

The true cause of these appearances, is the motion by which the earth turns round its own axis from west to east in the space of twenty-four hours. We proceed now to explain this motion by means of figure 2, which represents the globe of the earth. We shall suppose the point A to be the place of the observer, EMON his horizon, and the straight line P *p* to represent the axis round which the earth performs its motion of rotation.

It is easy to perceive, that the horizon of the observer, since it turns along with him during the rotation of the earth, must advance towards the stars successively, so as to give them the appearance of gradually approaching the horizon; in the same manner as a vessel leaving or approaching the land causes the objects on shore to appear to the eyes of an observer on board to be in motion.

As the plane MZN of the meridian turns at the same time with the horizontal plane NEMO, to which it is perpendicular, it must point successively to the same stars, which will then appear in the middle of that part of their course which they describe above the horizon. As soon as the star touches the western verge of the horizon, that star appears to set, and ceases to be visible until the motion of the earth has brought back upon it the eastern boundary of the same circle.

This explanation gives directly a reason for the diurnal appearing and disappearing of the stars, and of the sun. But in order to conceive the use which is made of these celestial appearances in astronomy and geography, it must be observed that these motions are measured only by *angles*, without any regard to the absolute and real length of distances. For example, if the star π, fig. 2, appear first in the horizon in the direction of the visual ray AF, and be seen afterwards in the direction of the ray AG, the eye of the spectator measures only the angular space FAG; it determines only the arc of the circle comprehended in this angle, and not the length of the radius. This arc is estimated in degrees and parts of a degree. The circumference of every circle, whether a great circle or a small, is supposed to be divided into 360 degrees; each degree is divided into 60 minutes, and each minute is subdivided into 60 seconds.

It is easy to see that we may, with regard to the heavenly bodies, substitute, for the plane NEMO, which touches the earth, a parallel plane, passing through the centre. The reason is, that, when a star situated at I appears in the horizontal plane which touches the earth at the point A, an observer, placed at the centre of the earth, would see the same star upon the line CI, so that it would appear elevated only by the angle IC *n*, which will be so much the smaller, according as the star is more distant. The figure renders this evident with regard to the star situated at the point H. The distance of the

[a] From the Greek word αρκτος, *the bear*, a constellation in the neighbourhood of the north pole.

[b] From the Greek words αντι, *opposite to*, and αρκτος *the bear*.

stars being almost infinite, compared with the semidiameter of the earth, which separates the place of the observer from the centre of the globe, this angle becomes insensible for the fixed stars, and very small for the planets.

We may substitute then without error, fig. 3, instead of the preceding figure, assuming for the horizontal plane, with regard to the stars, the plane NEMO passing through the centre of the earth, and parallel to the plane, touching it in A; or, what is the same thing, perpendicular to the radius CA, drawn from this point to the centre of the earth. We may conceive, in the same manner, the plane of the celestial meridian MZN, to be extended indefinitely around the centre C of the earth, through which it ought necessarily to pass, since it passes through the axis P *p*. This plane determines upon the surface of the earth a circle PA *p*, which passes through the poles; this circle is the terrestrial meridian of the place A, and at the same time, of all the places situated upon its circumference.

We ought to observe here, that the horizon represented by the circle NEMO, and which passes through the centre of the earth, is called the *rational horizon*, to distinguish it from the circle, which is a tangent to the surface that bounds the view, and which is called the *sensible horizon*.

The line drawn from the centre of the globe through the place of an observer, ascertains in the heavens the position of a point Z. This point is perpendicularly over the head of the observer, and is called the *zenith;* the same line produced through the globe, marks, in the opposite part of the heavens, another point *z*, which is called the *nadir*.

The position of the line ZAC, which is called the *vertical line*, is ascertained by the direction which heavy bodies take in falling, as that of the horizontal plane is indicated by the surface which water at rest and of inconsiderable extent naturally presents. The vertical line, or that which is ascertained by a thread when stretched by a plummet, is perpendicular to a like surface. This is the proper place to point out the precise situation of the antipodes. As gravity tends every where towards the interior of the globe, it acts at *a* in the direction *za* opposite to ZA; in both places bodies fall towards the surface of the earth. The people placed at *a*, having their feet opposite to the feet of those who are at A, are called the *antipodes* of these last. The *zenith* of the one is the *nadir* of the other.

It follows from this definition, that the horizon must change its position relatively to the stars, when the observer changes his place upon the surface of the earth. If he removes, for example, from A to *a*, fig. 4, directly along the same meridian from north to south, the horizontal visual ray NM, will become *nm*, so that a star E, situated upon the prolongation of the former ray, will appear to be elevated above the horizon *mn*, by the angle EC *m*, which is precisely equal to that formed by the radii CA, C *a* drawn to the centre of the earth; for the angles ACM and *a* C *m* being right angles, if we take from each the common angle MC *a*, it is evident that the remaining angles MC *m* and AC *a* are equal.

It was upon this principle that Posidonius, having observed that the star known by the name *Canopus*, appeared *in the horizon* at Rhodes, while it appeared at Alexandria in Egypt, elevated by the 48th part of the circle, or 7 degrees and a half, concluded that Rhodes was distant from Alexandria, in the direction of the meridian, by the 48th part of that circle. It is true that the Greek philosopher, from being ignorant that Rhodes and Alexandia are not under the same meridian, was wrong in imagining that, by this observation, he had determined the whole circumference of the earth. Still, however, his principle is true; it is the same that is employed at the present time in order to arrive at the most exact determinations: for, before measuring upon the earth the distance between any two points, it is necessary first to find, by means of observations made upon the same star, what ratio the arc A *a* of the meridian passing through the two points of observation, bears to the whole circumference.

By this observation is ascertained the relative position, with regard to north and south, of one place *a* to another A; but in order to determine in a manner more precise, the position of these places, there is required some fixed term of comparison. For this purpose we conceive a plane to pass through the centre of the earth at right angles to the axis of rotation, and to determine upon its spherical surface a circumference GEF, fig. 5, every point in which is at the same distance from the poles P and *p*. This circle is called the *equator*. Now, if an observer be situated upon the equator, the two poles will be found exactly in the horizon; but according as he removes from this circle towards either pole, that pole to which he approaches, will rise above, while the other sinks below the horizon. Thus when he is at *a*, fig. 4, the pole P appears elevated above the horizon by the angular space PC *n*, and when he arrives at A, this angle being increased by NC *n*, becomes PCN.

The height, or elevation of the pole above the horizon of any place, is equal to the angular distance of that place from the equator, estimated in the direction of the meridian. For the angles ACN and GCP, fig 5, being right angles, if we take away the common angle ACP, there remains the angle ACG equal to NCP. By inspecting the same figure, we perceive that the height to which the points of the equator rise above the horizon is equal to the complement of the angle ACG.

It is sufficient, therefore, to determine for any place the height of the pole above the horizon, in order to find the angular distance of that place from the equator.

In the regions of the globe, where one of the poles appears elevated above the horizon, the stars called *circumpolar*, that is, those stars which never set, furnish directly the means of determining the height of the pole. As they appear to describe circles about the celestial pole, each must appear equally removed from it in all directions; and as they twice pass the meridian during a diurnal revolution of the earth, namely, once above the pole, and once below it, we have only to measure their angle of elevation in each of these positions, and to take the arithmetical mean between the results, in order to obtain the elevation of the pole.

By measuring, for example, at Paris, during a long winter's night, the two meridian altitudes of the pole star, we find that, when it passes above the pole, its altitude is 50° 37′; and that when it passes below, it is 47° 4′; the sum of these being 97° 41′; the mean is about 48° 50′; which is within a few seconds of the altitude of the pole at Paris, or of the distance of that city from the equator

It is not enough to know merely the distance of a place upon the earth from the equator; because this distance is common to all the places which are situated upon a circle traced upon the surface of the globe by a plane parallel to the plane of the equator, and passing through the place in question. In order to distinguish places equally distant from the equator, it is necessary to know their meridians, the meridian being different for each place. The observation of the celestial motions may be here again successfully employed in the manner which we are now to point out. We have seen that the circles of the different meridians, PA *p*, PL *p*, PM *p*, &c. fig. 6, intersect each other in the axis PC *p*; but since all these meridians turn upon this line, they must also correspond successively to the same star; and the time which elapses between the passage of two meridians, containing between them any angle, will thus be to the time of the entire rotation, as the angle contained by these meridians is to the whole circumference of the circle. Hence, if we could measure the first of these intervals, in order to compare it with the second, we should be able to deduce the angle which the two proposed meridians form with each other. To obtain this comparison, it is necessary that we should be able to indicate, by a signal visible at the same time at places under the two meridians, the moment at which a star appears upon one of these meridians; this instant must be noted, and a well regulated clock will measure the time which elapses between this passage and that of the same star over the other meridian.

When we have determined by this method the angle which the meridian PL *p*, passing through the place L, makes with the meridian PA *p*, passing through a given place A, the place L becomes entirely determined, provided that we already know its distance GL from the equator EGF; for it will necessarily be situated at the intersection of the semicircle PL *p*, and the parallel LM, drawn at this given distance.

The shortest distance of a place from the equator is termed its *latitude*. This distance is measured by an arc of the meridian comprehended between the place and the equator. Latitude is north for those places which lie between the north pole and the equator, and it is south for places in the opposite hemisphere.

The angle contained by two meridians, measured by an arc of the equator, or of a circle parallel to it, is termed the *difference of longitude* of the places situated under these two meridians. That we may estimate these differences in an absolute manner, it is necessary to assume a *first meridian*, the choice of which is altogether arbitrary, and has varied at different periods. The absolute longitude of a place is therefore the angle which the meridian of that place forms with the first meridian.

We have just seen that the determination of the difference of longitude of two places upon the earth requires the use of a signal visible at the same time at both places. It is evident, that for places separated by any considerable distance, the only signals sufficiently elevated must be sought among the stars. It is indeed by means of these celestial bodies that the geographer determines the position of places. We must therefore acquire some idea of their motions, particularly of the motions of the sun and moon.

Every attentive observer of the heavens cannot but have remarked that the sun, besides its apparent diurnal motion, which it has in common with all the stars, appears, in the course of a year, to change its place in a twofold manner. First, it appears to rise and to sink alternately towards one or other of the poles, or towards the north and south. Again, if we observe its place among the stars, it appears either that the sun recedes daily towards the east, or that the stars advance in the opposite direction; for the stars which we see at any time set immediately after the sun, are, on the following evening, lost among the rays of the setting sun; some days afterwards they re-appear in the east, and their rising precedes daily more and more that of the sun. At last, after a year, or about 365 days, the sun and stars are again seen in the same relative position.

The complexity of these motions is yet increased by the confusion presented by the apparent motions of the other planets; sometimes they seem to be hurried along by an impetuous whirlwind, at other times they appear to become stationary, or even to acquire a retrograde motion. The impossibility of reconciling this confusion of the heavens with the most simple principles of physical science, involved Ptolemy, Tycho-Brahé, and all others who, like them, maintained the doctrine of the immobility of our earth, in a labyrinth of contradictory hypotheses. Copernicus reduced this chaos into perfect order and regularity, by supposing, with some ancient philosophers, that while the earth turns upon its own axis from west to east in the interval of a day, its mass having at the same time a motion in absolute space, likewise from west to east, performs, in a plane inclined to the equator, an entire revolution round the sun in the space of a year.

This double motion, which some minds still find it difficult to conceive, presents itself nevertheless to our view in the *top* which furnishes an amusement of childhood; at the same time that it turns, by a motion of rotation, upon the piece of iron, which, passing through it, forms its axis, it describes also upon the ground an orbit composed of curves which depend upon the impulse that it has at first received.

We proceed to the explanation of the apparent motions of the sun, according to the hypothesis of Copernicus. The axis of the earth, with regard to the plane of the ecliptic, that is, of the circle which the centre of the earth describes in its annual motion round the sun, remaining always parallel to itself, presents alternately each of its poles towards the sun. This phenomenon may easily be illustrated by fig. 7, in which the lines P *p*, which are parallel to each other, represent the axis of the earth, S the centre of the sun, and ABCD the elliptic curve which the earth describes about the sun. In consequence of this parallelism of the axis, the pole P, which is the one nearer to the sun when the earth is at B, becomes the more remote when the earth is at D; because in the former position the inclination of the part BP of the earth's axis is directed towards the inside of the curve ABCD; but in the latter it is directed towards the outside. At the two intermediate points, A and C, the axis PP is inclined neither towards the sun nor from it; but in every other point of the orbit ABCD, it necessarily takes an inclined position relatively to the sun. These different positions, being the cause of the

difference of the seasons, deserve, however, to be explained more in detail.

Let us examine the position in which the pole P is directed towards the sun, and which is represented in fig. 8.

A single glance shows us that the surface of the earth is at every instant divided into two parts, the one illuminated by the sun, and the other deprived of his light. The common boundary of these two parts is determined by the great circle IL *k*, whose plane is perpendicular to the line SO drawn from the centre of the sun to that of the earth. To this line we suppose the sun's rays to be parallel; seeing that from the great distance of the sun, and the small diameter of the earth, all convergency or divergency become insensible. It appears evident, therefore, that the circle IL *k*, which is denominated the *circle of illumination*, embraces the whole surface which the earth presents to the sun. Hence we see that the equator ELF being a great circle, and consequently divided into two equal parts by the circle of illumination, each point of the equator must necessarily be illuminated by the sun during half the time that the earth requires to perform its diurnal revolution. We see besides, that all the circles described by the different points of the arc PE are unequally divided by the circle of illumination, and that this inequality becomes more sensible according as the circles are farther removed from the equator. In this case the greater of the two portions lies upon the illuminated side of the earth; and it is only the smaller portion which lies upon the dark side: for all these points, therefore, the length of the day must exceed the length of the night. With regard to the whole region comprehended within the circle IK, described by the point I, there can be no night, since that circle lies entirely upon the illuminated side of the globe.

The other hemisphere E *p* F must necessarily present an appearance in every respect the reverse of that which we have now described. The length of the days must there diminish as we approach the pole; and the polar region, which lies entirely upon the dark side of the earth, is buried in perpetual night.

We see also, by the same figure, that while the earth revolves upon its axis, the point in which the line SHO, joining its centre with that of the sun, intersects its surface, traces upon it a circle, all the points of which come successively to receive the perpendicular rays of the sun; but if we remove from it towards either pole, we enjoy only the oblique rays. Hence it follows, the nearer a place is to the circle passing through the points G, H, the higher will the sun appear to rise above its horizon.

Let us now consider the length of the days and nights at the time when the earth is situated at the point A or C. In this position the solar ray SA or SC, Fig. 7. is directed towards the centre of the earth, in a line perpendicular to the axis; and the equator, as well as all the circles parallel to it, are divided into equal parts by the circle of illumination: but since the extent of the enlightened part of the earth is equal to that of the dark part, the length of the day must therefore be equal to that of the night, for every point of the surface of the earth. The seasons at which the centre of the earth is in these two positions, have been denominated the *equinoxes;* and as the sun is then in the plane of the equator, that circle has thus received the name of the *equinoctial line*, or simply of the *line.*

The time which elapses during the earth's motion from the point A to the point B in figure 7, is denominated the *astronomical spring*, for the hemisphere EPF As the earth, setting out from the spring equinox, advances in its orbit, the plane of the equator becomes more and more depressed in relation to the sun, which appears to rise towards the pole. When the sun has attained its greatest apparent altitude at the point B, the semi-axis BP of the earth has then its greatest possible inclination towards the sun, which at this season appears nearest to the pole P: that day is the longest of the year, and the summer of the hemisphere EPF commences. This situation of the axis appearing to remain the same for several days, this point is called the summer solstice. This is the position which we have examined in detail in figure 8, and which corresponds to the summer of our regions. The earth having arrived at the second equinox C, autumn commences in the hemisphere which we inhabit. At this season, the sun, appearing to descend in the heavens, returns to the plane of the equator, in which he again appears to perform his diurnal revolution. Having crossed the equator, the sun still appears to descend below it, while the semi-axis CP inclines, at the same time, more and more in the opposite direction, until the earth has reached D, the point at which the winter of the hemisphere EPF commences: the axis then remaining for several days almost in the same situation, this point is named the winter solstice. The position of the earth at this point may be examined by help of figure 9, which represents the winter of our regions. The duration of this season is determined by the time which the earth employs in returning to the point A. During this period, the pole P is approaching the sun, which consequently appears to ascend towards the equator, at which it arrives when the earth, returning to the point A, finishes its annual revolution.

In the opposite hemisphere E *p* F, the succession of the seasons is reversed, so that the spring of this hemisphere answers to the autumn of the other, and so on.

We remark farther, that the orbit of the earth ABCD, Fig. 7. being an ellipse or oval, in one of the foci of which the sun is situated, the earth employs a greater number of days in moving from the point of the spring equinox A, through the summer solstice B, to the point of the autumnal equinox C, than in describing the remaining part of its orbit. This circumstance gives to the northern hemisphere which we inhabit, the advantage of a spring and a summer a little longer than those enjoyed by the inhabitants of the southern hemisphere.

The first astronomers, in order the better to estimate this apparent motion of the sun, referred it to the constellations or groups of fixed stars through which the sun appears successively to pass, and which are twelve in number. The following are their names, and the characters which are used for representing them:

♈ Aries,	♉ Taurus,	♊ Gemini,
♋ Cancer,	♌ Leo,	♍ Virgo,
♎ Libra,	♏ Scorpio,	♐ Sagittarius,
♑ Capricornus,	♒ Aquarius,	♓ Pisces.

These representations of animals, which astronomers, in the infancy of the science, supposed to be traced upon the heavens, led them to give the name of *Zodiac*[a] to the zone which these twelve constellations occupy. Each constellation is called a *sign*. It is proper to remark, that, in consequence of a particular slow motion of the axis of the earth, the *constellations* no longer correspond to the same points of the orbit; but, as we confine the name of *signs* to the twelve divisions of the circumference of the circle which measures the whole revolution of the earth, and as these divisions, each of which contains 30 degrees, do not change, the spring equinox always corresponds to the first point of the sign *Aries;* the summer solstice coincides with the first point of *Cancer;* the autumnal equinox falls upon the first point of *Libra;* and the winter solstice upon the first point of *Capricornus*, although the constellations or groups of stars to which these names belong, have ceased to be connected with these seasons.

The apparent motion of the sun, by which he recedes from the equator, sometimes towards the north, and sometimes towards the south, causes him to pass successively through the zenith of all the points of the earth's surface, comprised between the two circles GH and *g h* (Figs. 8 and 9.) parallel to the equator, and upon which the rays of the sun fall vertically at the two solstices. These limits, at which the sun appears to stop and to retrace his steps, have received the name of *tropics*,—that is, *circles of return*.[b] That which corresponds to the summer solstice, is called the *tropic of Cancer*, and the other, the *tropic of Capricorn*.

The circles IK and *i k*, which circumscribe towards each pole, the part of the earth's surface deprived of the solar rays when the sun is in the opposite hemisphere, are denominated polar circles; the one is called the *arctic*, and the other the *antarctic* polar circle.

The surface of the earth is thus divided into five *zones*, or *belts*, by the polar circles and the tropics: those which are enclosed by the polar circles, being deprived of the heat of the sun for a great part of the year, and during the other part, receiving its rays but very obliquely, have deservedly received the name of *frigid*, or *frozen zones*. Two other zones, one in each hemisphere comprehended between the polar circle and the tropic, receive the sun's rays less obliquely than the frozen zones, but never vertically; these are the *temperate zones*. Lastly, the zone comprehended between the two tropics, each point of which passes twice under the sun in the year, and which receives constantly the solar rays, in a direction very little oblique, has obtained the name of the *torrid zone*. We shall elsewhere recur to the physical qualities of these great regions of the globe.

The ancient geographers frequently made use of a division of the earth into climates, which was founded upon the length of the day, compared with that of the night at the summer solstice. The climates are counted by the difference of half an hour, until we reach the polar circle, where the differences succeed each other more rapidly; from that circle to the pole they are reckoned by the month.[c]

The contrast of the seasons, in the hemispheres situated to the north and to the south of the equator, has given rise to certain distinctions which it is necessary to know, as they are sometimes met with in ancient books of Geography. The people who live under the same meridian, and at the same latitude, on opposite sides of the equator, are called *antœci;*[d] they reckon the same hours at the same instant, but they have opposite seasons. Those who live under opposite meridians, upon the same side of the equator, and at equal distances from it, are called *periœci:*[e] they reckon at the same instant opposite hours, the one having midnight when the other have mid-day; but lying towards the same pole, they enjoy the same seasons.

The ancient geographers distinguished the inhabitants of the earth likewise according to the direction of their shadows. They called *heteroscii*[f] those who inhabit the temperate zones, because their shadows, being always turned towards that pole which is elevated above their respective horizons, fall consequently in opposite directions. The inhabitants of the frozen zones, who, at one time of the year, enjoy the presence of the sun for upwards of twenty-four hours, see that luminary make a complete circuit round the heavens, so as to project their shadows in all directions; hence they have been called *periscii.*[g] Lastly, the inhabitants of the torrid zone are called *amphiscii* or *ascii*,[h] because their shadows, which are almost nothing at mid-day, are directed by turns towards either pole.

We pass to a distinction of more importance. In considering local phenomena, we distinguish three positions of the *sphere*, that is, of the assemblage of different circles which we have now pointed out, and which serve to determine the relative positions of the heavenly bodies.

To the inhabitants at the equator, the sphere is said to be *right*, because the plane of that circle passing through their zenith is, with regard to them, perpendicular to the horizon; and hence the heavenly bodies, which, in their apparent diurnal motion, describe parallels to the equator, appear to rise and to descend vertically in reference to the horizon. To the people who dwell between the equator and the poles, the sphere is said to be *oblique*, because the equator cutting their horizon obliquely, the apparent courses of the heavenly bodies can never be perpendicular nor parallel to their horizon. Lastly, at either pole, the horizon coincides with the equator, so that the heavenly bodies describe circles parallel to the horizon: to an inhabitant of the pole, therefore, were there any such, the sphere would appear *parallel*.

As the limits of the zones and of the climates depend upon the inclination of the axis of the earth to the plane of the ecliptic, it is of importance to determine this inclination. We may easily discover it by observing at one and the same place the greatest and least altitude of the sun, when it passes the meridian at the

[a] From ζωδιον, an animal.
[b] From τροπη, a return.
[c] See, at the end of the volume, a *Table of Climates*.
[d] From αντι, opposite to, and οικια, a habitation
[e] From περι, about, and οικια, a habitation.
[f] From ἑτερος, different, and σκια, a shadow.
[g] From περι, and σκια; see above.
[h] From αμφι, *around*, or from α, *without*, and σκια.

summer and winter solstices. For, since in both cases the sun is equally distant from the equator, on the one side and on the other, this circle must cut the meridian at a mean altitude between the two extreme altitudes of the sun; and the difference of these altitudes will be double of the angular distance to which the sun recedes from the equator towards the north and south. We shall determine at once, therefore, this distance, and the position of the equator above the horizon, and consequently, the latitude of the place of observation.[a]

At Paris, for example, the sun rises, at the summer solstice, to 64° 38′ above the horizon, and to 17° 42′, at the winter solstice. The sum of these altitudes is 82° 20′, of which the half is 41° 10′: this is the height of the equator above the horizon of Paris; and, taking its complement to a right angle, or to 90°, we find that the distance of the equator from the zenith, or the latitude of Paris, is 48° 50′.

By subtracting the one of these altitudes of the sun from the other, we find a difference of 46° 56′, of which the half, or 23° 28′, is equal to the number of degrees to which the sun recedes from the equator towards either pole. Such is the angle which the planes of the equator and ecliptic make with each other.

This is what is called the *obliquity of the ecliptic.* It is not invariable; observations, joined with the calculation of the forces which produce the motions of the planets, have shown that the inclination of the terrestrial equator to the ecliptic, is subject to a diminution of about 50″[b] in a century, till it reaches a certain limit which is not yet exactly determined, after which time it begins to increase.[c] The terrestrial zones vary therefore in proportion to this change. By assuming the mean of the present obliquity of the ecliptic, we find that if we divide the surface of the earth into 10,000 equal parts, the torrid zone will occupy 3982 of these parts, the two temperate zones, 5191, and the two frigid zones the remaining 827 parts.

The two combined motions of the earth produce in the estimation of time a difference that influences the methods by which geographical positions are determined. We distinguish several kinds of *days* and of *years.*

The *tropical,* or *solar year* is the time which the earth, setting out from one of the equinoxes, occupies in describing the ecliptic, so as to return to the same point: it comprehends 365 mean days, 5 hours, 48 minutes, 50 seconds.

It is denominated the *tropical year,* because this interval of time must elapse, in order that each season may return in the same order as before. In consequence of the apparent motion of the poles, or of the axis of the earth, the equinoctial points, as well as all the other points of the ecliptic, appear to have a retrograde motion with regard to the stars. This motion is denominated the *precession* of the equinoxes. Astronomers have estimated it at about 50″ in a year; which lengthens the annual revolution of the earth by 20′ 24″, when it is compared with the stars. The period of this revolution is named the *sidereal year,* and consists of 365 days, 6 hours, 9 minutes, and 12 seconds.

The length of the astronomical *mean* day, which is divided into twenty-four hours, is determined by the interval which elapses between two consecutive passages of the sun over the meridian of the same place, supposing this apparent motion of the sun to be performed with an uniform velocity. But it is necessary to observe, *first,* that our earth does not occupy quite 24 hours in its rotation, because that in the same time which it employs in revolving round its axis, it advances in its orbit towards the east about a degree in space,[d] corresponding to four minutes of time, or more exactly to 3 minutes 56 seconds. Hence it follows that the interval between two passages of a fixed star over the same meridian, which measures the true time of the earth's rotation, or of the *sidereal day,* is only 23 hours 56′ 4″. The sidereal day can scarcely be employed for measuring time in civil life, because the sidereal hours never coincide with the solar hours.

We make use therefore of the *solar day,* that is, of the time of a revolution of the earth about its axis, in reference to the sun; but this time is not the same at all the points of the orbit, or at all seasons of the year. This inequality arises from two distinct causes: the oblique position of the ecliptic with regard to the equator, and the inequality of the apparent motion of the sun in the ecliptic. The obliquity of the ecliptic causes the arc of the equator, which passes the meridian in the same time with the diurnal arc of the ecliptic, to be not always equal to it, but to be sometimes greater and sometimes less. With regard to the second cause, we observe that the sun, being placed in one of the foci of the elliptic orbit of the earth, appears to move more slowly in the six northern signs than in the six southern; and this difference of velocity is sufficient to render unequal the diurnal arcs of the equator. It arises from the union of these two causes, that the length of the solar day, compared with the time of the earth's rotation, is sometimes less and sometimes greater than twenty-four hours; and this inequality will always be greatest when the two causes which we have just explained concur in accumulating the differences in the same direction. The series of these differences form what is called the *equation of time,* or the quantity which must, at certain seasons, be added to, and at other seasons subtracted from, the hour indicated by clocks, which are regulated by the sun, and mark the *true time,* if we wish to get the *mean* or astronomical time. Now, it is for mean time that the astronomical tables are constructed, by help of which we calculate the motions of the stars, and from these motions deduce the geographical positions of places.

We have now considered the earth in relation to the sun; but it is also very closely connected with the moon. This satellite of our planet performs its revolution round the earth in 27 days, 7 hours, 43′ 11″: this time is usually called a *periodical month.* It is observed, that the moon employs a little more than this time to return to the sun after each conjunction. The true cause of this difference is, that the earth, and consequently the moon its satellite, advances in the ecliptic,

[a] The inclination of the earth's axis to the plane of the ecliptic, is the complement (66° 32′) of the inclination of the equator to the same plane, determined as above.—P.

[b] In the original, "about 52″"; by calculation of the combined effect of the planets, 50″; by comparison of observations, (*Ed. Encyc.*) about 51″ in a century.—P.

[c] Laplace, Système du Monde, p. 11. 197

[d] 59′ 8″.3.—P.

while the moon describes her orbit; so that before the moon comes into the same position relatively to the sun, 2 days and about 5 hours elapse, beyond the time required for completing a revolution. The whole time occupied in returning to the sun is 29 days 12 hours, 44′ 3″ 10‴. This space of time is called a *synodical month*, or lunar month. It commences from the moment when the moon is directly between the sun and the earth, in which position the moon is said to be in conjunction. This aspect is represented in figure 10, where S represents the sun, T the earth, and L the moon.

In describing its orbit, the moon takes, with regard to the sun, many situations, from which arise the aspects, or *phases*, which it assumes. The moon being an opaque body, can be seen only in as far as it reflects the light that it receives from the sun; it can be visible to us, therefore, only when it begins, after having passed the point L, to turn towards the earth a portion of its enlightened disk. This portion increases according as the moon recedes from the sun, until it arrives at L′, the opposite point of its orbit, when the earth being between it and the sun, we see the whole enlightened hemisphere; the moon then appears full, and is said to be in *opposition* with the sun.

The conjunction and opposition of the moon with regard to the sun, or the new and full moon, are what are called the *syzygies*. When the moon is distant from the sun a fourth part of the circumference, as at *l* or *l′*, it is in *quadrature*, and shows only one half of its enlightened hemisphere. It is the first or last quarter, according as the round edge of the enlightened part is towards the west or east.

One would be led to suppose that the moon, every time it comes into conjunction with the sun, ought to conceal from us the whole, or, at least, a part of the disk of the sun; and that every time it is in opposition, it ought to pass through the shadow which the earth projects behind it; so that there would be, in the former case, an *eclipse of the sun*, and in the latter, an *eclipse of the moon*. These phenomena do not, however, occur at every new and full moon; and the reason is, that the plane of the moon's orbit is inclined to that of the ecliptic, and that these two planes meet one another only in their line of common section, which passes through the centre of the earth. It is evident that the moon is not in the plane of the ecliptic, except when it passes through one or other of the extremities of this line, that is to say, when it is in the *nodes* of its orbit. When the conjunctions and oppositions coincide with the nodes, there are eclipses; in the opposite case no eclipse happens. We shall comprehend better these particulars by comparing figure 10, which represents in a *geometrical plane* the orbits of the earth and of the moon, with figure 11, which shows their *section* or *profile*, along the line ST. This line ST represents the plane of the ecliptic, and L *l* that of the lunar orbit. We proceed now to point out in what manner the observation of these phenomena enables us to determine the longitude of a place upon the earth.

We know, that in order to find the difference of longitude between two places, it is only required to ascertain precisely the hour which is reckoned at the same instant at each of these places, by the observation of some instantaneous phenomenon which can be seen at both.

The eclipses of the moon appear at first view the most favourable phenomena; for the entrance of the moon into the shadow of the earth takes place at the same instant for all the points of the hemisphere which is then turned towards the moon; that is, for all the places where the eclipse can be observed; besides, the spots visible upon the lunar disk, afford the means of making several observations upon the same eclipse, by marking with precision the time of the disappearing of each spot at its entrance into the shadow, or the *immersion*, and that of its reappearing at its coming out of the shadow, or the *emersion*: supposing that we have determined at each place the true time of this observation, the difference of these times, converted into degrees of the equator, will give immediately the difference of the longitudes. If all the results obtained do not exactly agree, the mean of all the observations is commonly taken; but it is much better to examine in detail the circumstances which have accompanied each observation, appreciating accordingly the relative accuracy of each, and to compare only those which are free from all suspicion of inaccuracy.[a]

There is no absolute need of corresponding observations. The astronomical almanacks, such as the *Connaissance des Tems* of the French, the *Nautical Almanack* of the English, or the *Calendrier du Navigateur*[b] of the Danes, give the results of the calculations of eclipses made beforehand for a known point.

It is in this manner that M. Lalande has determined the longitude of *Casbin*, a city in the north of Persia, from the eclipse of the moon which happened on the 30th June, 1787, and was observed at that place by the astronomer Beauchamp. The end of the eclipse, or the total emersion of the lunar disk from the shadow of the earth, having taken place at *Casbin* at 7 hours 45′ 30″, true time, and the calculation giving for Paris, 4 hours 36′ 38″, the difference, which is 3 hours 8′ 52″, is equal to the difference of longitude of Paris and *Casbin*. If we convert it into degrees, allowing 15 for an hour, which gives 15 minutes of a degree for a minute of time, and 15 seconds of a degree for a second of time, we shall have for 3 hours, 8′ 52″ in time, an arc of 45° 13′. This is the longitude of *Casbin* relatively to the meridian of Paris, as deduced from the above observation. But eclipses of the moon present this great inconvenience, that the instant when the lunar disk enters into the true shadow of the earth, the instant which marks the commencement of the eclipse, can never be assigned with precision; we cannot therefore be certain of not erring a few seconds of time in the determination of the phases of an eclipse of the moon; for this reason, the use of lunar eclipses for determining longitudes is now generally abandoned.

Cassini was the first who, in 1668, proposed to make use of the eclipses of the satellites of Jupiter, for the purpose of finding longitudes. The theory of these eclipses is the same with that of the eclipses of the

[a] *Burg*, in *Zach*, Astronomical correspondence, iv. 629. *Oltmanns*, Researches upon the Geography of the New Continent; *passim*.

[b] Seamen's Calendar.

moon; for the satellites of Jupiter, when placed in circumstances similar to those which produce the eclipses of the moon, fall, in like manner, into the shadow of their primary planet: if we observe at the same time, at several places, their immersions and emersions, we may make the same use of these, for the determination of longitudes, as of the eclipses of the moon. There are two other planets, Saturn and Uranus, which are also accompanied by satellites, but their smallness, and their distance, permitting them to be seen only by means of powerful telescopes, render the observation of their eclipses almost impracticable, or, at least, of little use. Even the satellites of Jupiter do not all equally well answer the purposes of the observer; for here, as in the eclipses of the moon, the precise moment of immersion and of emersion is always a little uncertain; particularly in the second and third satellites.[a] The use which may, nevertheless, be made of these satellites of Jupiter, has induced astronomers to frame tables for predicting their immersions, in order that corresponding observations may not be necessary.[b]

The eclipses of the sun are no less proper than those of the moon, for determining longitudes: it is sufficient for this purpose that we observe at each of the places of which we wish to know the difference of longitude, the commencement or the termination of one and the same eclipse; but the calculation is not so simple as in the case of a lunar eclipse. M. de Lalande, by great care and attention, has, by means of solar eclipses, corrected the positions of a great number of places. The calculation becomes more difficult, only because the relative situation of the sun and moon is not the same for the different points of the earth's surface at which these two bodies are visible at the same time. The case of the moon is the same as that of the clouds, which, seen from a particular point, appear situated before the sun, and project their shadow over a limited space, beyond which the sun shines in all its splendour. This spectacle varies continually, according as, from one instant to another, the sun, the cloud, and the spectator, change their situations. To employ the observation of a solar eclipse for the discovering of longitudes, it is necessary to determine several aspects of it, but particularly the beginning and the end; to deduce from thence the middle of the eclipse, and to obtain from the astronomical tables the proper *data* for fixing the respective positions of the lines described by the centre of the sun and that of the moon during the eclipse, in order that we may be able to calculate the instant when these two bodies were in conjunction. If we know then what hour at a given place corresponded to this same instant, the difference of these times indicates that of the longitudes.

The eclipses of the sun do not give the longitudes of places with much precision;[c] that of the 5th September, which was observed with the greatest care by three astronomers, exemplifies this remark. M. de Lalande deduces from it the longitude of Naples 47′ 3″ in time; —M. de *Wurm*, 47′ 40″, and M. *Triesnecker*, 47′ 20″

The celestial phenomenon which most frequently occurs, is that which is called an *occultation*, or the passage of a star behind the disk of the moon; it is, at the same time, one of those which may be observed with much precision.[d] It is necessary to determine by observation the moment when the centre of the moon is in conjunction with the star; this fixes the absolute position of the moon; next, either by means of the calculations made beforehand in the astronomical almanacks which predict these phenomena, or by the comparison of corresponding observations, we must find what hour it was, at the moment of this conjunction, at a place whose position is known. The difference of longitude is then obtained as in the other methods.[e]

It is evident that all these methods amount to this proposition, "*To determine for the place of which the longitude is sought, the position of a celestial body at a given moment, and to deduce from this position what hour it was at the same instant at another place of which the situation is known beforehand.*" Hence it follows that, without waiting for a celestial phenomenon, the change alone of angular distance between two heavenly bodies whose motion is known, should be sufficient to determine our place upon the earth. But it is also evident that the angular distance must change by the motion of one or both of the bodies with such rapidity as to present variations very considerable in the space of 24 hours. The moon alone affords us these advantages; as its motion in its orbit is at the rate of nearly 13° a day, a change of a single minute of a degree in its position, corresponds to a little less than 2′ of time, or 30′ of a degree in longitude. Now, by help of the very accurate instruments which we now possess, we can, by taking the angular distance of the moon from a star, or from the sun, ascertain with great precision the position of that body, and consequently can determine within a few seconds what hour it is, under a given meridian, at the moment of observation.

This method, denominated that of *lunar distances*, which was first suggested in 1514 by *Werner* of Nuremberg,[f] and developed in 1524 by Apian, a native of Saxony, was approved of, and recommended by various astronomers, and among others by the celebrated Kepler;[g] but the imperfection of the astronomical tables which showed the motions of the moon, rendered the practice of it uncertain. The endeavours of *Morin* to bring it into use, were not successful. Recommended anew, and better taught, in 1750, by *Tobias Mayer*, this method was employed with much success by the celebrated Danish traveller *Niebuhr*;[h] it has since been brought to great perfection by the labours of *Borda*, *Delambre*, *Burg*, *Maskelyne*, and more especially of *Laplace*. Ingenious instruments, constructed with the

[a] *Rossel*, Voyage d'Entrecasteaux, ii. 245. *Zach*, Astron. Correspond. i. 421.

[b] Table of the Satellites of Jupiter, by M. *Delambre*.

[c] *Zach*, Correspond. i. 73. note.

[d] *Rossel*, Voyage d'Entrecasteaux, ii. 244.

[e] They who wish to become thoroughly acquainted with this subject, must consult the memoirs of geometers, among others that *Upon the Calculation of Eclipses, subject to Parallaxes*, by M. *Lagrange*, printed in German, in the Ephemerides of Berlin, for 1782, but has been published in French only, in the *Connaissance des Tems* for 1818. M Arago observes, that there is found in it the ground work of most part of the analytical calculations that have since been published.

[f] *Werner*, notæ in Ptolom. Geog. lib. i.

[g] *Kepler*, tab. Rudolph. 37, 42.

[h] *Zach*, Astron. Corresp. iv. 246.

greatest care, tables calculated with astonishing accuracy, and a variety of formulas, now facilitate this operation, which has come into universal use, and, at sea, has justly superseded all the other methods.

To lunar observations, however, is joined the use of *time-keepers*, which serve in the intervals during which observations of the distance of the moon from the sun, or from a star, cannot be obtained. These instruments would alone accomplish the end proposed, if it were possible to construct them with such accuracy, that when once regulated to the time under a given meridian, their motion would remain exactly the same during the whole continuance of the voyage ;[a] for they would then at all times point out the hour under the said meridian. Even to the present time the efforts of Harrison, of Julien-le-Roi, of Berthout, of Armand, and of other celebrated artists, have not succeeded in giving to chronometers this absolute uniformity of motion ; they have approached, however, so near to this perfection, that, notwithstanding the perpetual agitation of the vessel, the derangement which the rate of these clocks suffers, is insensible even during a long voyage. The imperfections to which these instruments are still liable, are, besides, remedied by observing with care the quantity which they gain or lose in a given time, and by correcting their rate when we arrive at a place of which the longitude is known.

Such are the principal methods with which astronomy furnishes the navigator and traveller, for determining the longitude and latitude of the places which they visit. We have unfolded only the general principles upon which these observations are founded ; it is proper that we now take a rapid view of the errors to which these methods are subject, pointing out at the same time, the *corrections* to be applied for removing them.

The errors arising from optical illusions first present themselves to our notice. It is known that a ray of light is refracted, when it passes from a rarer into a denser medium. Hence the heavenly bodies are never seen in the true places which they occupy, the rays which enter the eye making their elevation above the horizon appear greater than the truth, by a quantity that increases according as they are nearer to the horizon. The state of the atmosphere with respect to density, influences this phenomenon. It is necessary to determine the quantity of this error for each degree of altitude above the horizon, in order that we may subtract it from the observed altitudes which are always greater than the true, except in the case of the body being in the zenith, because then the rays of light traversing the strata of the atmosphere perpendicularly, suffer no refraction.

Different physical causes, as heat, humidity, the density of the atmosphere, make refraction vary in different climates ; the laws of these variations are yet unknown, and form the object of researches of importance to the improvement of astronomy.[b]

We have seen above, that, on account of the smallness of the diameter of the earth, compared with the immense distance of the fixed stars, the observation of the altitudes of these bodies may always be referred to the centre of the earth, by supposing the rays of light to fall upon all the points of the earth in directions parallel to each other, and by neglecting consequently the angle AIC, Fig. 2 ; but this angle becomes sensible for the sun, the planets, and particularly for the moon, since in neglecting it we would estimate the position of each of these objects below its real situation with regard to the centre of the earth. To render all observations capable of comparison, astronomers have agreed to consider the *true place* of a heavenly body, that in which it would be seen were it observed from the centre of the earth. On the other hand, they denominate the *apparent place* of a heavenly body, that point of the celestial sphere to which it is referred when observed from the surface of the earth. The difference in the result of these two observations will depend, as we see, upon the angle AIC, under which the chord of the terrestrial arc which joins the two observers, would be seen from the centre of the heavenly body. This angle is called the *parallax*. It amounts for the sun to $8''.6$, and for the moon it varies from about $54'$ to $62'$. The effect of parallax being contrary to that of refraction, we must add it to the observed altitude, in order to refer the altitude to the centre of the earth.

We cannot enter into a detailed explication of the corrections required by the tables which are used for calculating the observations of longitude. The celestial bodies, though they obey laws which are immutable, are yet subject in their motions to the effects of their mutual attraction, which are called *perturbations*. Hence result many small motions of acceleration, or of retardation, of which the period is sometimes more than a century, and the equations are difficult to be ascertained with exactness. The progress of the higher geometry, the theories of *La Place*, and the calculations of Delambre, of Burg, and of other astronomers, have reduced to quantities almost insensible, the discrepancies perceived by means of corresponding observations.

There was, till of late years, another source of uncertainty, namely, the imperfection of instruments, which often caused the most scrupulous observers to err half a minute in the determination of an observed angle. At the present time, not only has mechanical skill introduced great accuracy in the construction of instruments, but the ingenious invention of the *repeating circle* of Mayer, which was brought to perfection by Magellan and Borda,[c] enables observers, by taking the multiple of the observed angle, to increase at pleasure the rigour with which its magnitude is determined, and to diminish the possible error almost to a second.

The two methods of finding the latitude, which we have already pointed out, are not sufficient for the purpose of navigators, who, in order to calculate their longitude by lunar distances, require to know at the same instant under what latitude they are placed. This inconvenience has been in part remedied by *solar tables*, calculated beforehand, and which give for every day of the year the place of the sun. The principle upon which the construction of these tables is founded, consists in presenting first the mean values of the princi-

[a] *Fleurieu*, Voyage de Marchand, *passim*. *Dubourguet*, Traité de Navigation, book iii. ch. 10. *Rossel*, l. c. &c.

[b] A. de Humboldt, Voyage, partie astronomique, i. p. 109. *sqq*. Essai sur les Refractions. Traité d'Astronomie de Biot, &c. &c.

[c] Bossut, Histoire des Mathématiques, ii. 489

pal elements calculated for the beginning of the year, and then to give the means of deducing for any other instant, either the true or the mean values of these elements. In all these calculations, the first thing to be known, is the mean longitude of the sun, and of his perigee, or of his apogee, for the instant which is assumed for the commencement of the tables. These initial values are called the *epoch of the astronomical tables.* By help of these tables then, we can find the position of the sun in his orbit at any instant, and may obtain the latitude of a place, on any day, by subtracting from the altitude of the sun, his distance from the equator, if he is above that circle, or by adding it, if he is below, and then taking the complement of the result to 90°. But, in order to multiply the means of determining the latitude, astronomers, having first fixed the position of their observatory, have calculated the distance of the principal stars from the equator, and the time which elapses between their respective passages over a given meridian, and that of the point of the ecliptic which corresponds to the spring equinox. The results of these calculations have been arranged in tables, by the aid of which the stars may be substituted for the sun in determining latitude.

These observations require that the position of the meridian be previously known. The pole-star indicates it nearly in the northern hemisphere of the earth; but the most universal and accurate method of finding it is afforded by the motion of the sun. Let us suppose the sun to be in one of the solstitial points; in which point it remains for some time apparently at the same distance from the equator, and appears to describe a circle parallel to the equator, whereof the part *d e f*, Fig. 1. which lies above the horizon, is divided by the meridian into two equal portions. The altitude of the sun is therefore precisely the same when observed before and after its passage over the meridian at equal intervals of time: on the other hand, if we take in the morning the altitude of the sun, and watch the moment in the afternoon when it returns to this same altitude, the hour of its passage over the meridian must necessarily lie in the middle between these two instants.

The lengths of shadows furnish the most simple method of determining the altitude of the sun. It is easy to see that this length depends not only upon the height of the objects by which the shadows are projected, but also upon that of the sun, relatively to the plane upon which the objects stand. If upon this horizontal plane we raise the vertical line AD, Fig. 12. the solar ray being directed along SD, the shadow will fall upon AC, and its length will depend upon the angle SCA, which evidently corresponds to the height of the sun above the horizon. When the sun, after having passed the meridian, returns therefore to the same altitude on the other side, and in the direction S′D, the shadow AB of the vertical line AD will be again of the same length with the shadow AC; and if we take the middle position of the shadow between the direction of the one and of the other, by dividing the angle BAC into two equal parts, by the straight line AN, we shall find the meridian. If the length of the staff AD is now measured, and that of its shadow, we shall be able to find the altitude of the sun, by the resolution of the rectilineal triangle CAD, which is rectangular at A, and in which the sides AD and AC are known, so that we may calculate the angle ACD, which is the altitude sought. The meridian altitude will be obtained, if we measure the length of the shadow when it falls in the direction of AN. It was by such means that the first astronomers determined the altitudes of the heavenly bodies. This rude instrument is called a *Gnomon;* but it has been abandoned since the instruments which measure angles immediately by arcs of the circle, have been brought to perfection. These last are employed even in determining the meridian, by combining them with pendulum clocks, of which the motion is very regular. Having observed in the morning an altitude of the sun, we mark at the same time the hour, then we watch the instant in the afternoon when the sun is at the same altitude, and taking half the interval, we find the time which has elapsed between the passage of the sun over the meridian, and either of the observations.

If, for example, the clock indicate for the same altitude, in the morning $8^h\ 45'\ 30''$, and in the afternoon $3^h\ 23'\ 12''$; the interval between these two instants is $6^h\ 37'\ 42''$, of which the half is $3^h\ 18'\ 51''$, and this added to the time of the first observation, namely $8^h\ 45'\ 30''$, gives $12^h\ 4'\ 21''$, for the hour which the clock must have indicated at the instant when the sun passed the meridian. The observation of these *corresponding altitudes,* many times repeated, serves to regulate the clock, and to ascertain exactly the moment of the sun's passage over the meridian, whence the direction of the meridian line may be immediately determined.

The observation of equal altitudes may be employed at every other season of the year, as well as at the solstice, by applying to the result a small correction for the change which the sun's declination undergoes in the interval between the two altitudes, and which causes the length of that interval to vary. A great many circumstances influence this kind of observations, and render them more or less subject to error, particularly when made on shipboard. The details must be sought for in works which treat professedly of these subjects.[a]

The position of the heavenly bodies relatively to the meridian, and their bearings from the north and south, and east and west points of the horizon, inasmuch as the former serves to ascertain the true hour, and the latter to fix the true north and south points, contribute to facilitate or to verify, the operations by which we determine the position of places upon the earth.

The *horary angle* of a heavenly body, is the angle which is formed at the pole, at the instant of observation, between the meridian of the place of the observer, and the circle of declination or hour circle, passing through the body. This last circle is nothing else than the meridian of the body. The horary angle is measured by the arc of the equator which has passed, or will pass, under the meridian of the observer, between the instant of observation, and the moment when the heavenly body is upon this same meridian.

The *azimuth* of a body, is the arc of the horizon intercepted between the south point, and that in which a vertical circle passing through the zenith and the body, cuts the horizon.

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[a] Levéque, Guido du Navigateur. Dubourguet, Traité de Navigation.

Amplitude is the arc of the horizon intercepted between the point where the body rises or sets, and the true east or west point. The former is called *eastern* amplitude, the latter *western* amplitude. The horary angle, the azimuth, and the amplitude, contribute in several ways to the determination of longitudes and latitudes; the first serves to ascertain the true hour, by only one observation of the altitude of the sun, and so gives the means of regulating the chronometer;[a] the other two indicate to the navigator how much the magnetic needle deviates from the true north and south line; they teach also the method of placing a geographical map due east and west.[b] Upon these relations of the heavenly bodies to the meridian and horizon, are likewise founded various subsidiary methods for calculating by approximation the latitude of a ship at sea;[c] but as these methods, though ingenious, are very subject to error, and are seldom used in geography, we shall not stop to describe them.

To all these methods which the observation and calculation of the celestial motions furnish, for determining geographical positions, is now added the use of signals made by gunpowder. In a very elevated place, during a serene night, a quantity of powder is from time to time inflamed in the open air; two observers, each provided with a clock, and stationed at the places of which the difference of longitude is required, mark with care the appearance of these flashes,—an appearance which, notwithstanding the distances, is instantaneous at the two places, in consequence of the prodigious velocity of light. The difference of the times indicated by the two clocks, will give the difference of longitude sought.[d]

Let us conclude this sketch, which is necessarily dry, of the methods by which longitudes and latitudes are determined, with observing to those of our readers who have no taste for such matters, that the exact knowledge of positions is the ground-work of all geography; and that without this knowledge, the most splendid description would only possess a merit altogether illusory.

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[a] Rossel, Voyage d'Entrecasteaux, ii. 27, *sqq.*

[b] Puissant, Traité de Géodésie, p. 300, *sqq.*

[c] Mendoza, Connaiss. des Temps, 1793, p. 289—302. Dubourguet, Traité de Navigation, b. iii. chap. 3, 4.

[d] Puissant, Géodésie, p. 299. Zach. Astron. Corresp. M. Schumacher, Professor of Astronomy at Copenhagen, has lately brought this method to singular perfection. In the measurement of the arc of the meridian, and of the perpendicular to that arc, which is committed to his superintendance by the King of Denmark, he has made use only of a luminous signal.

BOOK II.

Continuation of the Theory of Geography. Dimensions of the Globe determined. Its oblate figure. Basis of the new metrical System.

THE active curiosity of man did not rest contented with having demonstrated that the earth is a moving sphere; but proceeded to ascertain the exact dimensions of the planet which had been assigned to him in the immensity of space. An arc of the celestial meridian being measured, it was natural to conclude, that as this arc ought to correspond to a similar meridional arc on the surface of the earth, it would be necessary only to measure this latter curve, in order to find the dimensions of the entire circle, and consequently of the circumference of the globe.

We have already seen the wide difference in the apparent results of the different measures of the earth, undertaken by Eudoxus, Archimedes, Possidonius, and Eratosthenes;[a] we have pointed out the method of reconciling those measures, by referring them to different *stadia;* but we shall not at present enter on a formal discussion of the very intricate question whether those operations have been actually executed by the persons to whom they are ascribed, or if the Greeks have merely availed themselves of the science of a more ancient people, and taken credit for discoveries which they did not fully comprehend. In our opinion, the *stadium* being a measure of local and real distance, and not merely an astronomical modulus, it is probable that we are indebted to the Egyptians and Babylonians for the computations of the circumference of the earth, in *stadia* of 1111 and 833 to a degree, whilst the results found by using stadia of 700 to a degree, and other hypotheses, may be very well considered as the work of Eratosthenes, Possidonius, and other Greek astronomers.

It was observed, in the foregoing book, that Possidonius committed an error in taking for an arc of the terrestrial meridian that which connected Alexandria and Rhodes, since those places, which were the points of comparison, have not the same longitude. If we except this error, the method of Possidonius was the true one. Eratosthenes made use of a *gnomon* placed vertically in the centre of a concave sphere;[b] he knew that at *Syene*, the sun, at the time of the solstice, projected no shadow; he remarked that at Alexandria, the gnomon, at the same instant, projected its shadow over the fiftieth part of a circle; he hence concluded the latitude of Alexandria to be 7° 12′ north of Syene, which must have been situated under the tropic. But according to the moderns, the latitude of Syene is 24° 5′, consequently that of Alexandria would be 31° 17′, which is not far from the truth. However carefully this observation was made, the Greek astronomer could not adopt it as a solid basis for the measurement of the earth, as the two points which he compared are not situated under the same meridian.

The measures of a degree, attributed to the Arabians, exhibit in like manner equivocal results, and which cannot be reconciled with the truth but by means of arbitrary computations.

After the revival of letters, the European astronomers made many fruitless attempts to measure accurately a degree of the meridian.[c] In 1617, *Snellius*, after having determined the celestial arcs, comprised between Alkmaer, Leyden, and Bergen-op-Zoom, by the difference of the altitudes of the pole in those three places, calculated the terrestrial meridional distances of the three parallels, by means of a series of triangles connected together, and the base whereof was actually measured; he thus found that the value of a degree of the meridian was 55,021 toises, or 58,639 English fathoms, of six feet each. *Norwood*, an English astronomer, in 1635, measured with the utmost care a degree of the meridian between London and York; he found the degree to be 57,310 toises, or 61,078 fathoms, which result is a very near approximation. However, fifteen years afterwards, *Riccioli*, a celebrated Italian astronomer, pretended to have found by a measurement carried on in the environs of Bologna, that a degree of the meridian was 62,900 toises, or 67,036 fathoms; but this result is far from exact, as there is an excess of almost 6000 toises, or 6395 fathoms above the real value.

It was by applying the telescope to instruments used in the taking of angles, that *Picard*, of the Academy of Sciences of Paris, was enabled to carry on with the necessary precision, the new measure of a degree which he commenced in 1669. He chose for the theatre of his operations, the space contained between *Sourdon* in Picardy, and *Malvoisine*, on the borders of Gâtinais and Hurepoix.[d] In order to ascertain the itinerary distance which separates those two points, situate under the same meridian, he connected them by a series of triangles, Fig. 13; he observed successively all their angles, which furnished him for each a method of verification, as the sum of the angles of every triangle, is constantly equal to 180°. He scarce ever obtained this sum; but the inevitable errors amounted only to a few seconds.

A triangle is indeterminate, if only the angles be given, and we can obtain no more than the ratio of the sides; but one side being known, the rest are easily found. Picard therefore measured with a precision till then unknown, a distance of 5663 toises, or 6035 fathoms, on the road from Villejuif to Juvisy. With this base, represented by AB, in the triangle ABC, he cal-

[a] The author here refers to the *History* of Geography, (B. v. p. 90, 92) the Part first published in French, but which is to be the last of this translation.

[b] Cleomed, Meteor. I.

[c] Fernel, about the year 1530, divined with sufficient exactness, by a very imperfect method, the value of a degree between Paris and Amiens, which he computed to be 57,070 toises. This wonderful coincidence has not yet been explained.

[d] Picard, Mesure de la Terre, 1671.

culated the side AC; and with this he found CD, in the triangle ACD;[a] and thus he proceeded from triangle to triangle, as far as Sourdon. Here again was measured a right line RS, as a *base of verification*. The lines LM, IN, IG, verified by means of this base, gave only a difference of one or two toises from the first measure. New triangles were afterwards carried on, as far as the Cathedral of Amiens, where the operation ended.

It was then necessary to find the length of the line which joins those points, and its position with respect to the meridian of Paris, in order to ascertain the distance in the direction of this meridian; and also to determine accurately the amplitude of the arc measured on this circle, that is, how many degrees and parts of a degree it contained, in order to deduce its ratio to the whole circumference.

In this second part of his operation, which depended on the observation of the stars, he attached himself to that which is placed in the knee of the constellation of Cassiopeia. He preferred this star, because not being far distant from the zenith, it was less affected by refraction, which in his time was attended with much doubt. By this means he found that the difference of latitude between Malvoisine and Sourdon, near Amiens, was 1° 11′ 57″; that it corresponded in the direction of the meridian, to a distance of 58,430 toises, or 62,272 fathoms; and hence he concluded the length of the degree to be 57,064 toises, or 60,816 fathoms.

He found also, between the cathedral of Amiens and Malvoisine, a difference in latitude of 1° 22′ 55″, and a distance of 78,850 toises, or 85,034 fathoms, which gave for the degree 57,057 toises, or 60,808 fathoms; he chose the mean of both these results—57,060 toises, or 60,812 fathoms.

The circumference of the earth, like every other circle, is divided into 360 degrees; and by dividing a degree into twenty parts, called *sea leagues*, each of which is equal to 2864 toises, or 3052 fathoms, it will be found that the circumference contains 7200 of those leagues.

Its diameter, deduced from the circumference, is 2292 sea leagues, and its radius, or a right line drawn from the centre to the surface is 1146. Multiplying the circumference by the diameter, we find that the surface contains 16,502,400 square leagues.

The accuracy of Picard's operation, seemed to remove all doubt respecting the dimensions of the earth, when the important experiments made by M. Richer at Cayenne in 1672, showed that the figure of the earth was not perfectly spherical, and that consequently the degrees were not equal. His pendulum clock, regulated at Paris by the mean motion of the sun, after being transported to the island of Cayenne, which is only about 5 degrees from the equator, was found to lose every day 2 minutes, 28 seconds. The length of a pendulum, which at Cayenne beat seconds exactly, being marked upon an iron bar, which was brought to France, it was observed that the pendulum of Cayenne was $1\frac{1}{4}$ line shorter than that of Paris, which measured 3f. $8\frac{3}{5}$ lin. or, more exactly, 440,57 lines,[b] or 39,156 English inches.

This experiment proved that the force of gravity was less at Cayenne than at Paris; for when the pendulum which regulates the clock, deviates by its motion from the vertical position, the force which attracts it thither is gravity; and the interval of time it takes to return to that situation, is so much shorter, if the power of gravity augments, and so much longer if it diminishes. The index cannot point to a second, till after the pendulum has completed an oscillation, or after one fall in the vertical. Thus, if during a revolution of the stars, the index does not mark a sufficient number of seconds, the pendulum employs more time to regain its vertical situation and gravity, the power which impels it, is diminished.

This experiment, the importance of which was foreseen by the Academy of Sciences,[c] perfectly coincided with the reasoning of mathematicians, who began to consider the earth as depressed towards the poles; and the cause of the augmentation of gravity, or the attracting force, was explained by the depression of the surface, which therefore approaches nearer to the centre.

Huyghens, a Dutch mathematician, had the glory of divining that truth, even before the experiment of the pendulum was known. Considering that bodies which revolve round a centre, or an axis, acquire a *centrifugal force*, which tends constantly to make them fly off from this centre or axis, as we observe in a stone whirled about in a sling, he concluded, that the fluid diffused over a considerable part of the surface of the earth, could not assume a form perfectly spherical, as it must be affected at the same time by the centrifugal force and that of gravity impelling it towards the centre. He supposed, therefore, that the earth must be depressed towards the poles, and that the axis of rotation was shorter than the equatorial diameter by $\frac{1}{578}$, which is equal to about four sea leagues. This consequence, deduced from the centrifugal force by Huyghens, may be made sensible to the eye, by turning rapidly a wet bladder round an axis, which then assumes the form of a spheriod flattened towards the extremities, contiguous to the axis.

The immortal Newton, who, by profound reflection on the laws of the planetary motions ascertained by Kepler, discovered the principle of universal gravitation, no longer considered gravity at the surface of the earth as a constant force, every where directed towards the centre of our globe, but as the result of the mutual attractions of all the particles of the earth to each other; he found that this force varied a little in intensity and direction, from the earth not being perfectly spherical. If the figure of the earth depends upon gravity, gravity itself is regulated according to the figure which the earth has; this accelerating force, as to terrestrial bodies, ought to be perpendicular to the surface, and proportional to the distance; the earth having once assumed the oblate figure, this figure alone, independently of the centrifugal force, ought to render gravity weaker under the equator than under the poles. Newton, calculating on

[a] Short example of the calculation:—In the first triangle it was found by observation that CAB=54° 4′ 35″, ABC=95° 6′ 55″, ACB=3° 48′ 30″. By measurement AB was found to contain 5663 toises; therefore by the rule of proportion we find AC=11,012 toises, 5 feet, and so on

[b] A line is the twelfth part of a French inch.

[c] Lalande, Abrégé d'Astronomie, art. 742 and 805.

this principle, and supposing the earth homogeneous in all its parts, found, for the quantity of depression, $\frac{1}{230}$, or 10 sea leagues.[a]

Those conclusions, differing as to the quantity of the result, but agreeing with respect to the alteration which the figure of the earth ought to undergo in consequence of the centrifugal force, have been developed by the most delicate and profound calculations. Of these we can only here point out the results.[b] It has been demonstrated, that the earth could not be a homogeneous mass, but that its density ought to increase in descending to the centre; and that, in all cases, an elliptical figure satisfies the laws of the equilibrium of fluids.

At the same time, the theory of the diminution of gravity towards the equator, was confirmed by a great number of observations on the pendulum, from Lapland to the Cape of Good Hope;[c] and from their general agreement it has been concluded, that the depression of the globe is equal to the 332nd or 336th part of its axis.[d]

The theory of the depression of the earth might also be verified by measures taken on the terrestrial globe; for it results from this theory, that the degrees of latitude cannot be equal throughout the whole extent of the meridian, but that they ought to be augmented, in the flattened part of the meridian, that is, towards the poles, and diminished in the convex part of the same meridian, or near the equator. Those consequences, which flow from the fundamental notions of elementary geometry, were however for some time mistaken by men of very great merit, such as Cassini, and D'Anville. It may not therefore be improper to insist a little on the demonstration.

A degree of the meridian is the portion A*a*, Fig. 14, of that curve, when the radii CA, C*a*, which intercept that part of the arc, form an angle AC*a*, equal to the 360th of the circle. In consequence of this definition, it is easy to perceive that the radii CA, C*a* perpendicular to the tangents, will meet at the same distance within the curve only when this curve is a circle; that to the same arc will correspond the same angle, and that in this case the degrees throughout the whole extent of the curve will be of the same length. But this does not apply to curves whose curvature is not uniform. In the ellipse, for example, if we take two arcs of the same length, as M*m*, and N*n*, Fig. 15, one in the most convex part, and the other in the flattest part of the figure, the perpendiculars Mc, *mc*, drawn to the extremities of the former arc, will meet nearer in this arc, than the perpendiculars NC, *nc* drawn to the extremities of the other arc. The angle N*cn* is therefore visibly less than the angle MC*m*, and consequently if the latter be equal to one degree, the arc N*n*, equal in length to M*m*, does not correspond to a degree. To obtain this angle in the part NP of the curve, it is necessary to take in a space greater than M*m*. Therefore the terrestrial degrees must be greater in the flat part of the globe, if we would have them correspond to the celestial degrees which are all equal, not being real arcs, but only angular distances.

We may also reason in the following manner:—The point where two verticals meet, is the centre of the terrestrial arc contained between them; if this arc were a right line, the verticals would be parallel, or would meet only at an infinite distance. The greater the curvature of the arc, the more the verticals converge, therefore they meet at a less distance. Thus the part of an ellipse near its great axis being the most curved, the verticals which are perpendicular to it, will meet at a smaller distance. The radius of the arc intercepted between them will be shorter, and consequently, the absolute length of the arc itself will be less. On the contrary, near the small axis, the verticals meet at a greater distance, showing that the radius of the intercepted arc, and the arc itself, are longer.

By not tracing those notions to their source, the contrary was concluded at the commencement of the last century, because it was supposed that the degrees were determined by the angels M *om*, N *on*, formed by the lines drawn to the centre of the ellipse EPQ *p*; but this hypothesis was not conformable to the principles of the operation, for the lines OM and O *m*, ON and O *n*, not being perpendicular to the curve, differ entirely, both in magnitude and direction, from the verticals to which are referred the points of the celestial arc.

The measures of Cassini having seemed at first to indicate a diminution of the degrees from south to north, several learned Frenchmen maintained, by means of the paralogism above cited, that this diminution was a proof of the depression at the poles; the mathematicians demonstrated that it was rather a proof of the contrary. The error of the principle was at length discovered, and it has not been since revived but by entire strangers to geometry.[e] But Cassini and D'Anville, in deducing from the pretended diminution of the degrees towards the north, the natural conclusion, affirmed that the earth swelled out in its polar direction; or, in other words, that the terrestrial ellipsoid performed its revolution round its major axis; which was contrary to the theory of gravity and the equilibrium of fluids.

In France, the notion prevailed for forty years, that the earth is a spheroid protracted towards the poles.[f] At length, the Academy of Sciences resolved to ascertain the truth of the theoretical conclusions on the subject, and selected from their own body two companies of mathematicians, who were despatched, the one in 1736 to Peru, and the other in 1737 to the polar circle, to measure a degree of the meridian in the regions bordering on the equator and the pole. The results obtained by these companies, compared with each other, and with the degree measured in France by Picard, though they did not entirely agree with respect to the quantity of the depression of the earth at the poles, yet they completely dissipated all doubts of the fact.[g] The degree measured at the polar circle exceeded that of the equator by 669 toises, or 703 fathoms; and the French degree, though smaller than that of the polar circle, still surpassed that of the equator by 307 toises, or 327 fathoms.

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[a] Newton, Principia, b. iii. prop. 19.

[b] Clairaut, Theorie de la Figure de la Terre. Maclaurin, Memoir on the Flux and Reflux of the Sea. D'Alembert, Recherches sur le Système du Monde, &c.

[c] Dubourguet, Traité de Navigation, note i. page 290, 291. Histoire de l'Acad. des Sciences, passim.

[d] Laplace, Système du Monde, p. 250. Svanberg, Exposition de la Mésure d'un Degré.

[e] Bernardin de St. Pierre, Etudes de la Nature, &c.

[f] Bossut, Hist. des Mathématiques, ii. 273.

[g] Bouguer, Figure de la Terre. Maupertuis, Elémens de Geographie, &c.

The Cassinis themselves, after having verified their measures, had the candour to avow that they had fallen into some slight errors, and that the degrees measured by them in France concurred to prove the depression of the globe towards the poles.[a]

It was not enough that the science of mathematicians had described, in a general way, the figure of our globe, they further endeavoured to discover the exact quantity of that depression, the existence of which had been proved by so many experiments. But, in this investigation, the accumulation of the materials only increased the difficulty of the question. The degrees successively measured in different parts of the world gave very different quantities for the depression. This was demonstrated with great perspicuity by an Italian mathematician, by comparing the twelve best measures known for half a century back.[b] We shall first give the results of those measures, with the names of the astronomers to whom we are indebted for them:

Names of the Countries.	Latitude whence the measurement commenced.	Value of the degree measured.	Names of the Observers.
Peru - -	0d 0m	56,753 tois.	Bouguer, La Condamine, &c.
Cape of Good Hope	33 18	57,107	Lacaille.
Pennsylvania -	39 12	56,888	Mason and Dixon.
Ecclesiastical State	43 1	56,979	Boscovich and Maire.
France - -	43 31	57,048	Cassini and Lacaille.
Piedmont - -	44 44	57,137	Beccaria.
France - -	45 45	57,050	Cassini and Lacaille.
Hungary - -	45 57	56,881	Liesganig.
Austria - -	48 43	57,086	Idem.
France - -	49 23	57,074	Picard and Cassini.
Holland - -	52 4	57,145	De Thury and G. Cassini.
Lapland - -	66 20	57,405	Maupertuis, &c.

Note. One toise is equal to 1.06575 English fathoms.

Frisi endeavoured to calculate a regular curve according to Newton's theory, which might correspond to those twelve degrees, but he found them either too great or too small; the errors which should be supposed in the measurement in order to reduce them to a regular ellipse, whose minor axis would be to the major in the ratio of 230 to 231, amounted to more than 100 toises, or 106½ fathoms the degree, and for the degree of Hungary to more than 200 toises, or 213 fathoms.

Frisi also endeavoured to find, by binary and decimal combinations, a mean term between the different depressions pointed out by the measures; but as a severe criticism of the accuracy of each measure did not precede his combinations, we shall not here cite any of the results; we shall only observe that, by choosing, among his binary combinations, the six in which we can have confidence, we find for the mean term a depression almost identical with that furnished by the observations of the pendulum and the late French measures. Here is the comparison:

The difference of the axes, or the absolute value of the depression, being taken for unity, the first degree combined with the third, gives for the major axis of the earth 505 similar parts; with the fourth, 353; with the seventh, 292,3; with the ninth, 290,4; with the tenth, 307,4; and with the eleventh, 270. Therefore the mean term of the depression is equal to $\frac{1}{3\,3\,8}$.

The acknowledged impossibility of finding one regular curve which would correspond with the different degrees measured, produced different opinions among philosophers. The operation of M. Maupertuis in Lapland was first condemned as uncertain, either on account of the negligence with which it was conducted, or because the arc measured was not of sufficient extent, or, lastly, on account of the doubts which this mathematician himself had entertained with respect to the result of his measurement.[c] The same judgment should be passed on the measure of Father Liesganig, executed with very inaccurate instruments, and wherein it is now demonstrated[d] that there is a confusion of two stars nine degrees distant from each other, and other constant errors from 10 to 12 seconds, which correspond to 150 toises, or 160 fathoms; consequently this measurement does not deserve to be taken into consideration. Not being aware of this error in the operation of Liesganig, some very excellent mathematicians have given themselves the useless trouble of attempting to reconcile the irregularity of the degrees of Austria and Hungary with the general theory.[e]

The measures which might be safely relied on, took in but a small portion of the globe. Neither Frisi nor the other philosophers who have written on this subject, were acquainted with the degree measured in the year 1702, in China, in the 40th degree of latitude, by the Jesuit Thomas, the value of which degree was found to be 56,987.899 toises, or 60735 fathoms of six feet each; which, by supposing a depression of $\frac{1}{3\,3\,4}$, would differ only 23.983 toises, or 26 fathoms, in excess from the value presumed. But this measurement being susceptible of several interpretations, there can be no great harm in neglecting it.[f]

Some persons have been tempted to doubt of the possibility of measuring a degree of the meridian with perfect accuracy. The errors inseparable from the nature of the instruments then employed, might amount to 3 or 4 seconds for the celestial arc, or 60 toises for the terrestrial degree.[g] *The attraction* of mountains, which deranged the plumb-line by which the *vertical* is determined, excited the most restless doubts. This effect of gravitation, a striking proof of Newton's general theory, might affect measurements in other respects executed with the greatest care, since a deviation of the vertical line, of 15 seconds only, at both extremities of the arc measured, would cause an error of 500 toises, or 533 fathoms, which quantity is greater than the presumed difference of the two extreme degrees under the equator and the pole. But Newton had estimated this attraction at two minutes, for a mountain three English miles in height and six broad. This estimate, it is true, has appeared excessive. By the observations which Bouguer and La Condamine carefully made in 1737, in Peru, near the mountain of Chimborazo, the plumb-line deviated $7\frac{5}{10}$ seconds in consequence of the attractive

[a] Cassini et de Thury, Meridienne de l'Observatoire royale verifié, 1744.

[b] Pauli Frisi, Cosmographia, tom. ii. chap. de Figura Planet. Comp. id. opera omnia, t. iii. p. 123. *seq.*

[c] He makes the degree in his Figure of the Earth, 57,405, and in the Elements of Geography, 57.438

[d] Zach. Astron. Correspond. viii. 507. *et seq.*

[e] Dubourguet, Traité de Navig. p. 283, 308, &c.

[f] Hallerstein, Obser. Astr. Pekini Sinarum factæ, p. 363. Vindob 1768. Comp. Zach. Ast. Corresp. i. 248, 251, 589—594.

[g] D'Alembert, Encyclopedie, *Fig. de la Terre.* Bouguer, Fig. de la Terre, Sect. 1, § 4, &c.

force of that mountain, which, according to Newton's theory, should have produced an effect 13 times greater; but the nature of the volcanic rocks of that mountain renders the experiment dubious.[a] Similar effects have been observed in the Pyrenees, the Alps, the Appennine mountains, and in Scotland, where Maskelyne repeated those observations with the utmost precision, and obtained a result which approaches nearer to Newton's theory.[b] It is very possible that this attraction may have affected the measures taken by Lacaille, since that astronomer performed no experiment to determine the effect of the mountains of the southern part of Africa, on the plumb-line of the instrument which he made use of.

At length, a simple and decisive idea presented itself to the mind of some superior geniuses, who were fatigued with the interminable dispute of the earth's depression. It was supposed *that the curvature of the terrestrial spheroid might be subject to some slight irregularities.* Why should nature, which is not fond of geometrical figures, have made the earth a perfect and regular ellipsoid? Buffon was one of the first who proposed this opinion;[c] Condamine seems to have favoured it;[d] and Maupertuis, who at first had loudly rejected it, at last only doubted of it:[e] Lacaille, whose measures did not agree with any other, naturally inclined to an explication which justified his operations. However, natural philosophers in general still objected to this opinion, which was feebly supported by those who had advanced it.

A more serious attempt to maintain the regular ellipsoid, was made by M. Klügel, a German mathematician. To demonstrate that all the degrees accurately measured, even that of Lacaille, might be applied to a regular ellipse, he supposed a small difference existed between the *minor primitive axis of the terrestrial ellipsoid, Pp Fig.* 16, and *the actual axis of rotation* $\Pi\pi$; whence would result for example, that the Cape of Good Hope, might have been originally nearer to the south pole, or, more accurately speaking, that the southern extremity of the axis of rotation has changed its position with respect to the equator *Eq.* Therefore the southern degree *ab*, although more distant from the pole of rotation π than the northern degree from the pole Π, might nevertheless be in the same situation with respect to the true minor axis of the ellipsoid P*p*; and would consequently have the same absolute value, notwithstanding the difference of latitude.[f] It is obvious what revolutions would take place on the earth, if this hypothesis had any foundation. It is evident that the major axis of the globe would no more coincide with the plane of the equator; and is it possible, according to the laws of hydrostatics, that the terrestrial ellipsoid could perform its revolution round any other axis than its real minor axis? But, whatever objections may be made to M. Klügel, his hypothesis appears so ingenious, and would be so fruitful in interesting results for physical geography, that we thought proper to give an idea of it here.

Such were the doubts of astronomers and mathematicians respecting the figure of the earth, when a political project afforded an opportunity for undertaking a new measure of the arc of the meridian, which, passing through the capital, traverses France. The National Convention ordered that a uniform and permanent system of weights and measures should be established. The philosophers proposed to found the basis of this system upon nature, and to *take as the primitive unity* of *measure*, or *metre*, the *ten millionth part of a quadrant of the terrestrial meridian*, that is, the space between the equator and the pole. It was said that a metrology founded on such a basis would belong to every age and nation. But how were they to find precisely the length of the fourth part of the meridian? They could not deduce it from the ancient measures, for these contradicted each other; it was therefore determined that the new metrological system should be rendered more authentic by founding it upon new operations, conducted with a precision till then unknown, and directed by the most able astronomers. Delambre and Mechain were appointed to measure the arc of the meridian intercepted between the parallels of Barcelona and Dunkirk. These two celebrated geometricians measured the angles of 90 triangles with the new repeating circles which Borda had constructed; they observed with these instruments, 5 latitudes at Dunkirk, Paris, Evaux, Carcassonne, and Barcelona. The two *bases* near Melun and Perpignan were measured with platina and copper rules, and were found to agree, to a few inches, with the measures calculated. Minute attention prevented or rectified the smallest errors. The most eminent of the French mathematicians, together with a number of others sent from different countries, verified and sanctioned all the calculations. No farther doubt, therefore, can be entertained respecting the results of this vast enterprise, which commenced in 1792, and terminated, as to the measurement, in 1798.

It has been proved, that the degrees of the meridian diminish towards the south, and increase towards the north. But this augmentation of the terrestrial degrees does not follow a regular and constant progression. Therefore no meridian whatever can be a regular ellipse. It is probable, that the earth itself is not a *solid of revolution*, that is, circumscribed by the revolution of an individual ellipse round its centre. However, these irregularities, which appear extremely small in comparison with the mass of the earth, may, without inconvenience, be overlooked.

The meridian of France, which Messrs. Biot and Arago have lately prolonged, by a very tedious operation, as far as the isles of Ivica and Fromentera[g] gives, if we consider it apart,[h] for the quantity of the depression $\frac{1}{150}$, but, by comparing it with the degree of Peru, it would give $\frac{1}{334}$.

This latter result, adopted by the commission of weights and measures, coincides with what was found by observing the pendulum. It agrees also with several

[a] Bouguer, Fig. de la Terre, p. 389.
[b] Philosophical Transactions, 1775, p. 500.
[c] Nat. Hist. tom. i. p. 165.
[d] Rapport sur les Mésures du Pérou, p. 262.
[e] Lettres Physiques.
[f] Klügel, Dimensions de la Terre, &c. in the Astronomical Collections of Berlin, iii. 164—169.
[g] Biot, Notice of the operations carried on in Spain. Mercury, Jan. 7, 1810
[h] Laplace, Système du Monde, p. 62.

celestial phenomena, the cause whereof is the non-sphericity of the earth; for this planet being swelled towards the equator, the attraction of the sun and moon is there more powerful than towards the poles; and, as the plane of the equator is inclined to the ecliptic and lunar orbit, this additional attraction communicates to the axis a progressive motion, which causes the equinoctial points to retrograde, and an alternate motion, by which it oscillates around the position it would have by virtue of the first motion. The former is called the *precession of the equinoxes*, and the latter the *nutation*. M. Burg, a celebrated German astronomer, having calculated, at the request of M. de Laplace,[a] the causes of those perturbations, and the influence of the earth's depression, found the latter to be $\frac{1}{3\,0\,5}$.

The degree measured at the polar circle by the French academicians in 1737, was that which differed the most from the general result deduced from all the other data. We have already mentioned, that considerable errors were suspected in the operation, and this has been since demonstrated. M. Mclanderhielm, a learned Swedish astronomer, undertook to get a new degree measured by M. Svanberg, one of his pupils, and for that purpose the repeating circle was employed, and all the delicate methods of modern *geodesia*. The French academicians had measured only an arc of 57′, but M. Svanberg extended the operation to 1° 37′. By the definitive result of this measure,[b] a degree of the meridian is found to be 57,209 toises, or 60,970 fathoms, in latitude 66° 20′, or 196 toises shorter than that which was measured in 1737. This, compared with the French degree, gives for the depression $\frac{1}{3\,0\,7}$, and with that of Peru $\frac{1}{3\,2\,4}$. We may also, by different hypotheses, combine this measure with a depression of $\frac{1}{3\,3\,0}$. Thus there is no essential difference between this result and that which was adopted by the French mathematicians.[c]

Observations made on the planets, which are several millions of leagues distant from us, have concurred to establish our ideas respecting the oblate figure of the terrestrial spheroid. This alteration of the spherical figure, resulting from the rotation of a celestial body on its own axis, appears also in the planet Jupiter, where it is so sensible that the difference of both diameters of the disc may be discerned by means of a telescope. This difference is almost $\frac{1}{1\,6}$; and when we compare the exact measure of this depression, the dimensions of Jupiter, and the time of his rotation with those of the earth,[d] we find for this latter planet a proportional depression of $\frac{1}{3\,3\,8}$; which still coincides with the grand French measure.

It must not be dissembled, that this accord, which apparently ought to have been universal, was affected by some new doubts suggested by two German mathematicians, by reason of the geodesical operations of the English. The two measurements in the East Indies, the one by *Burrow*, under the tropic, the other by *Lambton* at 12° north latitude, have furnished results which combine tolerably well with those of the French measures, though they are still more favourable to Newton's theory.[e] But the measure of 3 degrees by Major Mudge[f] in England, gives, according to the German mathematicians, considered by itself, a depression under *the equator* of $\frac{1}{5\,5}$th. This singular result seems to prove decidedly, that the spheroidal figure of the earth is subject to irregularities which can only be determined by multiplied measurements.[g]

We may therefore consider the quantity of the earth's depression as sufficiently determined for geographical purposes. There are few geographers indeed, who, in the construction of maps on a small scale, have paid attention to the depression or ellipticity of the earth. Maupertuis, Murdoch, and others, have indeed calculated tables, which give the increase of the degrees of longitude on an elliptic spheroid.[h] The geographer Bonne demonstrated to Rizzi Zannoni,[i] that in his large map of Europe, he ought to have made allowance for the effect of ellipticity, which was then presumed to be $\frac{1}{1\,7\,9}$. But the measures and calculations have now changed one of the elements of this question. The depression of the earth, reduced to the $\frac{1}{3\,3\,4}$ of the equatorial diameter, not producing between this diameter and that which passes through the poles more than a difference of about 7 leagues, would give for a spheroid, the major axis of which would be 3 feet, a difference of only $1\frac{1}{3}$ line, or about $\frac{1}{8}$th of an inch, a quantity which it would be extremely difficult to observe with precision in the construction of globes. They may therefore be made perfectly spherical. In topography and special hydrography the effect of ellipticity is perceptible not only in the degrees of latitude, but also in those of longitude; it is the duty of a careful geographer to attend to it, by following the methods which several late works give for expressing these differences.[k] The tables annexed to this volume give all the necessary details for ascertaining the absolute value of each degree of longitude

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[a] Laplace, Système du Monde, p. 218.

[b] Svanberg, Exposition of the Operations carried on in Lapland. Stockholm, 1805, p. 164—192.

[c] Since the publication of this work, the king of Denmark, full of zeal for the progress of the sciences, has ordered an arc of the meridian to be measured which passes through Jutland, Fionia, Holstein, and Lauenbourg, and which contains 4 degrees of latitude. This measurement is entrusted to one of the ablest modern astronomers, M. Schumacher of Copenhagen. At the same time, the celebrated M. Gauss of Gottingen, is directed to measure an arc of the meridian of 3 degrees in Hanover. This operation will likely be connected with that of the Danes.

It is known that, since the publication of this volume in 1812, (second edition,) the English and French mathematicians have connected together the grand and magnificent geodesical operations of France and England.

By these measures, the curvature of the earth is exactly determined from the Shetland islands to the island of Fromentera. See the *Notice* published by M. Biot.—*Author's note.*

Laplace, Système du Monde, 253.

[d] Zach. Corresp. xii. 488—493.

[e] Phil. Trans. 1803, part ii. p. 383. Comp. Lindenau in Zach. Corresp. xiv. 137, *et seq.*

[f] Laplace, Mecan. Céleste, ii. 144. Since the publication of this work, few memoirs have appeared on this subject, at least to our knowledge; but the opinion, supported by so many physical probabilities, that the earth is composed of two unequal hemispheres, seems to have been rejected by Laplace. *Note of the Author.*—Much light will be thrown on this subject by the labours of Mudge, Colby, Kater, Macul loch, &c. who have been employed lately in extending the British arc of the meridian to Shetland, combining it with the French arc, and determining the length of the pendulum at different points.

[g] Maupertuis, Elem. de Géograph. Comp. Mem. de l'Acad. des Sciences, 1744, p. 466.

[h] Refutation of a work of M. Rizzi Zannoni, entitled, Dissertation on different points of Geography, by M. Bonne, a rare work, communicated by M. de Lalande to M. de Zach. Corresp. i. 186.

[i] Puissant, Traité de Géodésie, p. 125, *et seq.* Dubourguet, Traité de Nav.

and latitude, as also for the comparison of the new metrical system with the ancient measures. However, we cannot terminate this short historical account of the investigations relative to the figure of the globe, without placing before the reader the principal results of the great French measure.

Basis of the New Metrology.

	In Metres.	In French Feet.
The fourth part of the meridian -	10,000,000	30784440
The Decimal degree - - -	100,000	307844,4
Myriametre - - - -	10,000	30784,44
[a] Kilometre - - - - -	1,000	3078,444
Hectometre - - - -	100	307,8444
Decametre - - - - -	10	30,78444
Metre - - - - - - -	1	3,078444

New Astronomical Divisions.

The fourth of the meridian -	100°	
Degree - - - - - -	100′	
Minute or prime - - - - - - -		100″
Second - - - - - - - - - -		100‴

Compared with the Ancient Astronomical Measures.

1 Centesimal degree equal to - - -	54′
1 Minute - - - - - - -	32″4
1 Second - - - - - - -	0″324

Dimensions of the Globe.

	In Metres.	In Toises.
Radius of the equator or semi-major axis of the terrestrial ellipsoid - - - - -	6,375,750	3,271,226
Radius of the semi-minor axis - - -	6,356,662	3,261,432
Depression at the poles, or excess of the equatorial above the polar radius - - -	19,088	9,794
Radius of the earth supposed to be spherical	6,366,206	3,266,329
Circumference of the ellipsoid under the meridian of Paris - - - - - -	39,999,867	20,522,960
Circumference under the equator - -	40,059,948	20,553,717

Note. The French metre is 39.371 English inches; the toise, according to General Roy, is 1.0657 English fathoms.

[a] The name adopted is *Kilometre;* but it is a barbarism: the proper expression is *Kiliometre.*

Principal Degrees.

	In Metres.	In Toises.
Ancient degree of Latitude under the equator	110,614	56,753
Ancient degree of latitude at 45° N. latitude -	111,117	57,011
Ancient degree of latitude at the pole - -	111,612	57,264
New degree of latitude under the equator -	99,552	51,078
New degree of latitude at 50° N. (new meas.) -	100,006	51,310
New degree of latitude at the pole - - -	100,449	51,538

	On a Sphere.	On a Spheroid with a depression of $\frac{1}{315}$.
New degree of longitude at 0° of latitude	100,000[m]	100,149[m]
Id. at 50° N. latitude (new div.) -	70,711	70,922
Id. at 99° latitude - - - - -	1,571	1,577

The minuteness of those differences by which our terrestrial ellipsoid has been proved to deviate from a perfect globe, strikingly exhibits the accuracy and nicety of the methods employed by astronomers and mathematicians. What delicate instruments must have been used, what rigorous calculations made, in order to determine, within a few toises of the truth, the dimensions of this vast globe, in comparison of which our body is but an atom! Let not this discovery at least be attributed to the ancients! If some learned men have pretended to see clearly, in some vague phrases of the ancients, a notion of the polar depression,[b] there are others who have as clearly discovered the idea of an equatorial depression;[c] those two opposite opinions, therefore, destroy each other. The notion even of the ellipticity of the terrestrial globe could not arise but from a clear idea of universal gravitation. It was therefore reserved for the genius of modern geometry to draw the human mind into this bold and subtle research.

[b] Freret, Mem. de l'Acad. des Inscriptions, tom. xviii. p. 112.
[c] Burnet, Theoria Telluris Sacra, p. 26, 136, 137.

BOOK III.

Continuation of the Theory of Geography. Of Terrestrial Globes. Of their Construction and principal Uses.[a]

To fix well in the mind the different parts of knowledge which form the study of geography, it is necessary to have before our eyes an image of the earth and its parts, on a small scale. The most simple of these representations is the *artificial terrestrial globe;* it is the earth in relief, with its seas, continents, and islands. The mountains, rivers, and principal towns, are also indicated on it. All these points have on the artificial globe their *true position;* they are represented in their totality and relatively to each other, as they are situate on the earth itself, according to astronomical observations and geodesic measures. A geographical map can only give perspective views of a part of the globe, in which there are always more or less of errors of convention.

We find in the artificial globe the material image of those mathematical circles which serve to give us an idea of the various relations of the earth with the heavenly bodies, and of terrestrial places with each other. Thus, on the surface of the globe ought to be indicated, the terrestrial equator, the tropics, the polar circles; then, by weaker lines, the other parallels to the equator, from 5 to 5, or from 10 to 10 degrees, according to the size of the globe. We also find the meridians indicated from 5 to 5, or from 10 to 10; they are numbered at their point of intersection with the equator. The parallels to the equator are also numbered at the place where they cut that meridian which has been chosen for the first. The ecliptic is also marked on good globes.

The poles are indicated by two points, on the axis of which the globe turns. These two points are fixed to a circle of metal which surrounds the globe from one pole to the other, so that on turning the globe, every terrestrial spot passes under this circle. It serves, therefore, as a *general meridian*, and is so called. The degrees of latitude, and even, on large globes, the minutes and seconds, are marked on the general meridian.

The bearers, or feet of the whole machine, support a circular band of metal or wood; it cuts the globe, in whatever position it may be placed, into two hemispheres, one superior, the other inferior; and thus represents the rational *horizon*. This artificial horizon has several circles traced on its surface; the inmost marks the number of degrees of the twelve signs of the zodiac; on it are the names of those signs and the days of the month. Another circle is divided into thirty-two parts, which mark the points of the compass.

The quadrant for taking heights is intended as a substitute for the compass in different researches. It is a little plate of copper attached to the general meridian, and divided into 90 degrees,[b] which serves to measure the distance and position of places without the compass. The *horary circle* is fixed on the north pole; it is divided into 24 hours, and bears a moveable needle, which turns round the axis of the globe. There is also at the foot of the globe a *compass*, which should be fixed in the parallel and meridian of the horizon.

Globe-makers, and especially those of Paris, have been so careless of late years, in the delicate construction of that instrument, that a lover of geography cannot be too scrupulous in examining the quality of a globe before he purchases it. He should ascertain the complete correspondence of the divisions marked on the circles. The degrees of the equator and the ecliptic should be equal with each other and with those of the quadrant. The same equality should exist between the degrees of the general meridian and the horizon. These divisions are examined, by intercepting with a compass a certain number of degrees, and by trying if, with the same opening of the compass, the same number of degrees can be intercepted every where. The globe should be at an equal distance from the general meridian and from the horizon, and far enough from them never to rub against those circles; which only happens in the very worst globes. The globe should be balanced perpendicularly on the two points which represent the poles. This is known, if, when turned, it stops as soon as the hand is taken from it. The equator should, in all positions, cut the meridian, and, if there be one, the horizon, into two equal arches; it ought therefore always, on turning with the globe, to coincide with the points where the quarters of those circles begin. In the parallel sphere, it should always preserve the most exact parallelism with the horizon. In like manner, the tropics and polar circles should every where coincide with the latitudes that belong to them.

The network, or assemblage of the lines representing the circles of longitude and latitude, should correspond exactly in all its joinings; which is very seldom the case even in large globes; the surface of the paper pasted on the globe being rarely conected with perfect exactness.

The globe serves, generally speaking, to recapitulate the elements of mathematical geography. In order to show its use, we shall now explain its primitive construction. The most simple and most exact way of constructing a globe is to draw immediately on its surface, by the means we are about to describe, the circles, lines, and points, which it ought to represent.[c]

Let us suppose that two points diametrically opposite, have been fixed to represent the poles, and that the axis of rotation is to pass through them: taking one of these points for a centre, at an equal distance from each, a circle must be described, which will be the equator; another great circle will be drawn through the

[a] Bion, Usage des Globes, 1718. *Schiebel*, Instruction sur l'usage des Globes Artificiels (en Allemand) 1779 & 1785.

[b] It commonly goes to 114 degrees, or to the arc equal to the diameter

[c] Varenius, General Geography, b. iii. chap. 32. prop. 5.

poles to represent the *first meridian*, which will be divided into 90 degrees, setting out from the equator towards each pole: afterwards, setting out from this meridian, the circumference of the equator must be divided from degree to degree. These two circles being determined, it is easy to mark on the globe a place, the latitude and longitude of which may be learnt from the geographical tables; for it will be sufficient to mark the former on the first meridian, and through the point where it falls, must be described, taking the pole for the centre, the circle parallel to the equator, passing through the proposed spot; then drawing through the point of the equator on which the longitude falls, and through the poles, a semicircle, the meridian will be had, whose junction with the parallel marks the position of the place.

It is thus that the *circles of latitude* and of *longitude* are traced on the globe, at the distance of 10 or 5 degrees from each other. With respect to these circles, the following remark may be perhaps a little too elementary for most of our readers.

The *circles of latitude* are parallel to the equator; they diminish therefore necessarily till the last circle of latitude is identified with the point of the pole itself. The *circles of longitude*, or the *meridians*, go from pole to pole, and cut the equator perpendicularly; they are equal, with a very slight difference. The degrees of latitude are counted only on the circles of longitude, and *vice versâ*. The *degrees of latitude* are, therefore, little arcs of $\frac{1}{360}$ of a *circle of longitude*, intercepted by two *circles of latitude*. They would of course be equal without that small difference, which proceeds from the depression, and makes them increase a little towards the poles. The *degrees of longitude* are little arcs of $\frac{1}{360}$ of a *circle of latitude*, intercepted by two *circles of longitude*. Therefore the degrees of longitude go on diminishing in proportion as the circles of longitude come near each other; and at the point where all these circles, till then convergent, cut each other, that is, at the pole, there is no more longitude.

The reckoning of the latitudes begins at the equator. This commencement is naturally determined by the circumstances of the earth's motion. It is otherwise with the longitude; for all the meridians being great circles, nature furnishes no motive for choosing one in preference to any other, as a term from which to begin to count, or as *first meridian*. We need not be surprised, therefore, that geographers have varied much in their choice.

Ptolemy fixed his first meridian at the Fortunate Isles, (now the Canaries,) because it was the most western limit of the countries known in his time; and as their extent from east to west was more considerable than from south to north, the former received the name of *longitude*, or length, the latter that of *latitude*, or breadth, which they still bear. This first meridian of the ancients is not known with certainty, as its position depends on the precise meaning of the appellation *Fortunate Isles*, a point which we shall discuss in the history of geography.

In order to render the manner of expressing longitudes in French geography uniform, Louis XIII. ordered, by an express declaration, that the first meridian should be placed in the *Isle of Ferro*, the most western of the Canaries. Delisle, one of the first who endeavoured to give precision to geographical determinations, fixed the longitude of Paris 20 degrees east of that meridian. When, by more rigorous observations, it was known that the difference of longitude between Paris and the principal town of the Isle of Ferro was 20° 5′ 50″, it was necessary to advance the first meridian 5′ 50″ to the east of that point, so that it is now a circle of mere convention, which passes through no remarkable point.

The Dutch had fixed their first meridian at the Peak of Teneriffe, a mountain situated in the island of that name, and then esteemed the highest in the world.

Gerard Mercator, a famous geographer of the 16th century, chose the meridian which passes through the island *Del Corvo*, one of the Azores, because in his time it was the line on which the magnetic needle suffered no variation. It must be confessed, that it is the most natural and the most commodious point of departure with respect to maps of the world.

Geographers have only agreed together in maintaining an abuse, that is in understanding by the name of the meridian of a place, only the half of the great circle corresponding with the celestial meridian; the other half, which is in the opposite hemisphere, with respect to the poles, is sometimes called the *anti-meridian*.

According to the custom of geographers, the longitudes begin to be counted from the eastern side of the first meridian, and are reckoned in the same direction over the whole circumference of the equator, till they return to the western side of the meridian. In this way of counting the longitudes may rise to 360°

These conventional arrangements have not been adopted by mariners. Astronomical observations having become of general use in navigation, and the tables which indicate the moment of the celestial phenomena, and the position of the heavenly bodies at different epochs, being always calculated for the meridian of the principal observatory of each nation, navigators found it more convenient to refer to this meridian the points of the routs they followed. Thus French mariners count from the meridian of the observatory of Paris; the English from Greenwich; the Spaniards from Cadiz. Let us observe, moreover, that mariners estimate the longitude from the difference of time which elapses between the passage of the meridians through the same heavenly body, or from the difference of hours counted at the same moment in two different places. If one has advanced towards the east, one counts more than under the meridian from which one set out; the contrary happens when one advances towards the west. It is necessary, therefore, when we convert a difference of time into a difference of longitude, to indicate if it be *oriental* or *occidental*. In this way of counting, the longitude is always marked by the side nearest the first meridian, so that the longitudes only embrace the semi-circumference, or do not rise beyond 180°, and the globe is divided into two hemispheres with respect to the first meridian; in the hemisphere situated to the west, the longitudes have the denomination of *occidental*; and in the other *oriental*. All marine charts are established according to this system of numeration.

These diversities in the manner of estimating the longitude necessitate calculations of reduction. We are

obliged, before using a map, to examine what is the meridian adopted by the geographer, "which often embarrasses even learned persons."[a]

When we have to do with longitudes reckoned according to the method of geographers, that is, by making the entire tour of the globe by the east, we must take the difference of longitude of the two meridians to be compared; and if the meridian from which we wish to set out is to the west of the other, this difference must be added to all the longitudes counted from the other; in the contrary case it must be retrenched.

For example, Moscow is 35° 12′ 45″ from the meridian of Paris, how many is it from that of Greenwich? Add the difference, which is 2° 20′ 15″, and you will have the result 37° 33′. Here is another: Paris is 20° from the meridian of the Isle of Ferro, how many is it from the Dutch meridian of Teneriffe? This meridian being a degree more to the east than the other, retrench 1° from the given longitude, and you will have 19°. In this calculation there happen two particular cases. The result by addition may surpass 360°; for example, Madrid is 353° 57′ 40″ from Paris, counting in the manner of geographers, how many from the Isle of Ferro? You find, on adding the difference of the meridians, 373° 57′ 40″; but as this sum exceeds the value of the whole circle, you see you have repassed a second time through the meridian of the Isle of Ferro. You must, therefore, retrench 360°, and you have 13° 57′ 40″. In the same way it sometimes happens, that the given longitude is less than the difference of the meridians to be retrenched from it; in this case 360° are added to the longitude, the difference is then retrenched, and the sum required is found. For example, the isle Gomera is 32′ from the Isle of Ferro, you ask how much it is from the meridian of Teneriffe? Add 360° to 32′, retrench the difference, and you have 359° 32′, which is the longitude required. The reason of these operations is perceived on repeating them on the globe.

The reduction of longitudes, reckoned according to the practice of navigators, is much more in use. In setting out from the same meridian, all the oriental marine longitudes, as far as 180°, remain the same as in the manner of reckoning adopted by geographers. With respect to the occidental marine longitudes, it is sufficient to deduct them from 360°, to bring them to the numeration of geographers. Here is an example: Venus's Point, in the island of Otaheite, has been determined by navigators to be 151° 50′ 30″ of western longitude from the meridian of Paris. If from 360° we take off 151° 50′ 30″, the difference, which is 208° 9′ 30″, will be the longitude according to geographers. It is evident that, by an inverse operation, we may transform into nautical longitude the geographical longitudes above 180°, by deducting them from 360°.

If we set off from two different meridians, we must observe on what side the meridian to which we wish to refer the longitudes is placed with respect to the other. We must retrench their difference from all the longitudes of the same denomination as that side, and we must add to all those of a contrary denomination. An example will make this rule more easy. The meridian of the observatory of Paris being 2° 20′ 15″ to the east of that of Greenwich, all oriental longitudes with respect to Greenwich must be diminished by that quantity to be referred to the meridian of Paris, and the occidental longitudes must be augmented by that quantity. It is thus that the longitude of the Cape of Good Hope being 18° 23′ 15″ to the east of the meridian of Greenwich, becomes 16° 3′ to the east of that of Paris: on the contrary, Cape Horn, placed by the English at 67° 21′ 15″ west of Greenwich, is 69° 41′ 30″ west of Paris.

In these reductions, as in those of the geographical longitudes, it may happen that the points to be reduced fall between these two meridians, or between their opposite meridians. The place which is oriental with respect to one, then becomes occidental with respect to the other. In the first case, we can no longer retrench, from the longitude to be reduced, the difference of the two proposed meridians; we must do the contrary, and change the denomination. In the second case, the number which results from the addition of the difference of the meridians, to the longitude counted from the meridian we wish to change, surpasses 180°, because it is beyond the meridian opposite to that to which the longitudes are referred; it must, therefore, be retrenched from 360°, or from the entire circumference, to make it go off from the contrary side of the same meridian; the longitude consequently changes its denomination again.

Dover, for example, is 1° 18′ 30″ to the east of Greenwich. Subtracting this longitude from the difference of the meridians 2° 20′ 15″, there will remain 1° 1′ 45″, which is the *occidental* longitude of Dover with respect to the meridian of Paris. Here is an example of the second case: At Turtle Isle, situated in the Pacific Ocean, the English count 177° 57′ west longitude. Adding to this 2° 20′, we find 180° 17′. The place is, therefore, 17′ beyond the meridian opposite to that of Paris; and by retrenching 180° 17′ from 360°, we have 179° 43′ of east longitude with respect to the meridian of Paris.

When the principal circles of longitude have been traced on the globe, and places known by observations have been marked on it, which are generally the capitals of states, the most frequented ports, and most salient promontories, it only remains to fill up the intermediate spaces, by drawing from the best geographical maps the sinuosities of shores, the course of rivers, and the chains of mountains. But as all the materials of these designs must be taken from maps, of which we shall explain the construction in the following Books, it would be premature to treat here more at length of the rules to be observed in choosing the best, and in transferring them to the globe with the greatest exactness. We shall only remark, that the method of delineating geographical outlines immediately on a ball of copper, wood, or any other matter, is only employed by lovers of the science who wish to join instruction with amusement, or by geographers who are particularly employed by some great nobleman. The globe-makers use a method less tedious, less expensive, which allows them to multiply copies. They have a general map of the world drawn and engraven, and distributed into slips,[b] that is, spherical seg

[a] D'Alembert, Encyclopedie.

[b] *Fuseaux*, spindles. See p. 49.

ments, with which they cover the ball destined for a terrestrial globe. The way of tracing these slips will be indicated in its place.

The first use that is made of the globe, is to determine the distance from one place to another. The shortest distance of two points on the sphere, is measured by the arc of the great circle which joins them; and as all great circles are equal, the degrees of any one of them contain the same number of itinerary measures as those of the meridian. We take therefore with a compass the opening of the arc comprised between the points proposed, and carry it to the meridian or the equator, which are graduated.

If, for example, the arc comprised between two places marked on the globe, and brought to the meridian, contain 10° 45′, we shall have the shortest distance between these points in itinerary measures, by converting the degrees and minutes into marine leagues of 20 to a degree. We first obtain 200 leagues for the 10°, and each minute being equivalent to a third of a league, or a *nautical mile*, the 45′ will give 15 leagues: thus the total result will be 215 marine leagues.

In delicate operations, however, it is better to use calculation, which gives a more precise result. Let us consider, for example, the spherical triangle APL, Fig. 6, formed by the meridians AP and PL of the places A and L, whose distance we require, and by the arc of the great circle AL, which joins them. In this triangle we know the sides AP and PL, which are the distances of the points A and L from the pole P, or the complement of their latitudes, and the angle APL, which is measured by their difference of longitude; the rules of spherical trigonometry will give us, in degrees and parts of degrees, the side AL, which we can convert into itinerary measures. In the case where the places A and L are in different hemispheres, one of their distances from the pole will be greater by 90° than the latitude of the place itself.[a]

If the places of which we wish to know the distance have the same meridian, it is only necessary to take the difference of their latitudes, and to convert it into itinerary measures. A difference of some minutes in longitude has no sensible effect on the result; thus, we should hardly mistake more than a league in measuring the distance from Paris to Algiers on the meridian of Paris, though it is 41′ more to the west than that of Algiers.

It would be a great error to take the difference of longitude in *degrees* of two places, situated on the same parallel, for the measure of their distance; this can only be done when the places are situated on the equator, which is a great circle; but its parallels being small circles, the radius of which diminishes as we approach the poles, it follows from the principle stated above, that the absolute length of their arcs does not give the true measure of the shortest distance between the extremities of those arcs; this distance can only be measured by a great circle passing through the two extreme points. For as the radius of the parallel is shorter than that of the great circle, the arc of the parallel must necessarily have a greater curvature than that of the great circle comprised between the same points, and is consequently longer. Here is a striking example: Petersburgh is almost under the same latitude as the isle of Kodiak, in Russian America; the difference of longitude is about 180°, equivalent under this parallel to 1800 marine leagues; but the shortest distance between these two places is, counting on a meridian that is almost common to them, 60 degrees of latitude, equivalent to 1200 leagues. It is true that, to take advantage of this, it would be necessary to cross the eternal ice of the pole. Thus, in geography as in politics, the straight road is not always the most advantageous.

It is necessary, therefore, in many cases, to measure the distances on the parallels, and, consequently, to know exactly the value of the degrees of longitude marked on the parallel circles. The globe renders the diminution of these degrees towards the poles sensible to the eye; our tables indicate it in detail:[b] But we should know the mathematical principles of it. The length of the degrees marked on the parallels is proportionate to the radii of the circles; but the radii of the equator, and of its parallels, are perpendiculars let fall from the different points of the meridian on the diameter of each of these circles, as in Fig. 6. the lines EC and HK. Consequently, if we take the radius EC for the length of the degree of the equator, and if we divide it into twenty parts, representing marine leagues, the number of these parts which the radius HK of the parallel LM may contain, will indicate the value of the degree of this parallel in leagues. Hence it results, that, to determine the length of the degrees on each parallel, we have only to describe on a line EC, which represents the length of the degree of the meridian, or of the equator, a quarter of a circle EP, divide it into degrees, and let perpendiculars fall from each point of division on the radius CP; these lines will mark the respective lengths of the degree of the parallel for each latitude.

As the line HK is the sine of the arc PH, and the cosine of the arc EH, one of which indicates the distance from the parallel HM to the pole, and the other the latitude of that parallel, it is evident that, taking for unity the degree of the equator, that of any parallel whatever will be the cosine of the latitude given by the trigonometrical tables. For example, the latitude of Paris is 48° 50′, and the cosine of this angle 0.658 of the radius; multiplying this number by 20 marine leagues, we have for the value of the degree of the parallel 13 leagues $\frac{6}{10}$. In the latitude of Petersburgh, or 60°, the

[a] Some of our readers will be pleased, perhaps, with an example of this sort of calculation.

The distance from Paris to Philadelphia is required. Longitude of Philadelphia, 77° 36′ 0″ W. Long. of Paris, 0° 0′ 0″. Difference of Long. A = 77° 36′ 0″. Lat. of Paris, 48° 50′ 15″ N.; therefore the complement B = 41° 9′ 45″. Lat. of Philadelphia, 39° 56′ 57″ N.; therefore the complement C = 50° 3′ 3″. Multiply the *tangent* B by the *cosine* A, you will have a tangent which we shall call x. It must be subtracted from C if A is below 90°, and added if A is above. There results the quantity we shall call y. Now, as the cosine x is to the cosine B, so the cosine y is to the cosine of the distance required D. The calculation is made by means of the Tables of Sines.

Log. tang. B = 9.94165	Log. cos. x = 9.99249
Log. cos. A = 9.33190	Log. cos. B = 9.87670
	Log. cos. y = 9.88790
Log. tang. x = 9.27365	
Therefore x = 10° 37′ 48″	Log. cos. D = 9.77211
C = 50° 3′ 3″	therefore D = 53° 42′ 50″
	= 1074 leagues, 20 to a degree.
C − x = y = 39° 25′ 15″	

See the trigonometry, and the general formulas in Puissant, Traité de Geodesie, art. 89. Comp. art. 30.

[b] See the *Tables* annexed to this volume.

degree of longitude is reduced to 10 leagues, because the cosine of 60° is the half of the radius.

We have mentioned what is to be understood by *north* and *south*, *east* and *west*; it is by studying the globe attentively that we come to understand perfectly the value of those terms. Two terrestrial points, situated under the same meridian, are directly north and south of each other, and all the intermediate points, that is to say, all the points of the line of distance, are equally north and south of each other, and all reciprocally on the same point of the compass. In like manner, any two points whatever, taken under the terrestrial equator, are directly east and west of each other, and all the intermediate points are equally so, and are reciprocally on the same point of the compass.

If we take two places which are neither under the same meridian, nor under the equator, whatever be otherwise their relative position, none of the intermediate places will be, with respect to the other places, on the same point of the compass. For the arc of a great circle which measures the distances, is an arc of a vertical circle which passes by the zenith of the two places in question; but every vertical circle which is itself neither a meridian, nor perpendicular to the terrestrial meridian, (like the equator,) will cut all the intermediate meridians under angles unequal among each other. But it is these angles of position which determine the point of the compass in which a place is relatively to another. Therefore, as all the intermediate places between the two places in question will offer angles of position unequal in degrees, each of them will be on another point from the following place than what the preceding place was from it. Thus, in following the shortest rout, between two places situated out of the equator, and under different meridians, the point of the compass would change at every step. This is demonstrated by Fig. 17, where PE*p* represents a meridian, EGI*i* the equator, HLQ a parallel, and HIK*i* the great circle perpendicular to the meridian in H. We perceive, also, that all the great circles perpendicular to the same meridian, meet in two opposite points I and *i*, which are the poles of that meridian. These great circles must, therefore, continually approach each other; and it is only in a very small space, on each side of the meridian PE*p*, that the circles IE*i* and IH*i* can be considered as parallel with each other; and hence, too, it can only be in a small extent that the lines *east* and *west*, or the perpendiculars to the meridian, can be considered as parallel.[a]

As the great circle IHK, perpendicular to the meridian *p*EP, cuts the other meridians under angles different for each, while the parallel HLQ meets them all at a right angle, it is evident that, in going from the point H to the point L on the parallel, we turn off every moment from the direction we at first followed, to place ourselves at a right angle with the different meridians we cut, and which all unite at the pole P. We cannot, therefore, trace on the terrestrial surface a parallel to the equator, or advance directly either *east* or *west*, but by means of a compass, or still more exactly, by determining the meridian from place to place, and keeping one's self always in the same latitude.

This difference between the points *east* and *west* of the globe, and those of each place in particular, has an influence on navigation and on maritime charts. The navigator endeavours, as much as possible, to sail on the same point of the compass, at least for a certain time, otherwise he cannot know where he directs his course. Moreover, he must first direct his course so as to reach the spot he wishes to go to; and secondly, he should go by the shortest way possible. If a vessel sails always east and west under the equator, its route will be an arch of the equator, and consequently the shortest road between two places situated under the equator. If a vessel be directed constantly north or south, it will describe an arc of the meridian, and at the same time the shortest road between the place of departure and that of arrival. If a vessel, out of the equator, sails constantly east or west, it will describe a parallel to the equator. Therefore, if the place of its destination is to the east or west of that of departure, and under the same parallel, the vessel would arrive there indeed, by sailing always on the same point of the compass, but sometimes by a very tedious course.

If, on the contrary, a vessel is directed constantly towards the same point of the compass, that point not being one of the four cardinal points, it will describe on the globe *a curve, which does not return into itself, but which is indefinitely prolonged in a spiral manner, always approaching the pole, without ever reaching it.* The *loxodromic line* may be also defined to be, a species of logarithmic spiral, described on the surface of the sphere, having the meridians for its radii.

This line was discovered by Nonnius, a Portuguese mathematician, who was asked by a navigator what was the cause of a phenomenon, which undoubtedly would astonish those who had not read what we have just mentioned. It is asked, *why going constantly on the point east to reach a place really situated to the east of another, (by the shortest route,) one never gets there, but, on the contrary, always gets the farther from it?* The reason is, that by always following the same point of the compass out of the equator, and changing the meridian, we do not describe the arc of the great circle which measures the distance of the two places, but a spiral or loxodromic curve, which will never pass by the spot required

It is necessary to go on the loxodromic curve which passes by both places, or on a line which cuts the intermediate meridians under an angle equal to the angle of inclination of the loxodromic curve which passes by the two places.[b]

There are two points on the globe where there is neither *east* nor *west*; these are the two poles. The globe may also be considered with respect to the extent of its surface. We have seen, that it is 16,501,200 square marine leagues, supposing the earth a sphere. If we wish to know the extent of any zone whatever contained between two parallel circles, geometry teaches us, that the surface of a spherical zone is to the area of the sphere as the distance of the parallels which bound it is

[a] See afterwards *Projection of the Maps of Cassini.*

[b] Maupertuis, Discours sur la Parallaxe de la Lune, 2, 12, 13, 14. Mem. de l'Acad. des Scien. 1754. Varenius, ch. 39, &c. Dubourguet Traité de Navigation

to the diameter; and this distance answers on the diameter to the difference of the sines of the latitudes of each parallel, as is seen on Fig. 6. by the line CK, difference between CP and KP. If, for example, we wish to estimate the zone comprised between the 48th and 49th parallels, and in which are Paris and its environs, we say,

The sine of 49° being 0,755
That of 48 0,743

The difference . . 0,012

Reduced to half 0,006, shows us that this zone contains the $\frac{6}{1000}$, or $\frac{3}{500}$ of the total area of the globe; which being estimated at 16,501,200 square leagues, we conclude that the zone contains 99,007 square leagues.

With this datum, we shall easily calculate the extent of each space comprised between two parallels and two given meridians; it is necessarily in the same relation to the entire zone, as the difference of longitude of the two meridians is to the entire circumference: we find consequently the value of the quadrilateral bounded by two meridians a degree distant, and by the 48th and 49th parallels, by taking the 360th part of the number 99007, which indicates the total area of the zone. This quadrilateral is about 275 square leagues.

As all maps are divided by the meridians and parallels into quadrilaterals, which have commonly 1, 5, or 10 degrees, it is plain that a similar calculation for each zone and each quadrilateral, comprising a degree of longitude and a degree of latitude, would give a series of results, by the help of which one might estimate almost directly, either on the globe or on maps, the extent of each terrestrial region.

We should only have to examine how many quadrilaterals, of an equal value in degrees, were inscribed or circumscribed in the figure of the country we wish to measure, take the value in square leagues from the table, and then estimate that of the strips which might happen to fall out of the limits of these quadrilaterals. By these means, borrowed from *spherical* trigonometry, we should avoid the errors which almost necessarily happen when we wish to make use of the *scale* of a common map for measuring, according to the rules of *plane* trigonometry, the square surface of the different regions of the earth. Maps which represent a spherical surface on a plane surface, inevitably give the spaces too large or too small either in the centre or the circumference. Their *scales* or modules of measure cannot be applied uniformly to their surface.

A German geometer[a] has calculated from these principles, *tables of the square surface of the zones*, of which we shall insert a translation at the end of this work. We shall now show, by an example, the use of these calculations.

The state of Pennsylvania is limited to the north by the parallel of 42°, and to the south by the parallel of 39° 43′ 25″; it extends, in the direction of longitude, from 2° east (of Washington,) to 356° 37′ 30″ west.[b] There is to the north only a small triangle towards the lake Erie, and a strip comprised in the bend of the Delaware, which extend beyond this figure; but as the surfaces to be added are very nearly balanced by the corners of the neighbouring states which enter into the quadrilateral, it may be considered as equal to the total surface of Pennsylvania. Now the four zones from 40° to 40° 30′, from thence to 41°, to 41° 30′, and to 42°, should, according to the tables, have a surface of 217,345.77 square leagues, 20 to a degree. But the zone between 39° 43′ 25″, and 40°, is only 16′ 35″ in breadth. We must multiply, therefore, the surface of the entire zone of half a degree, which, according to the tables, is = 55312 square leagues, by $\frac{16'35''}{30'} = \frac{995''}{1800''}$. Which gives for the surface of this small zone 30599.11 square leagues; a sum which, added to that of the four zones of half degrees, forms a total of 247944.88 square leagues for the surface of the whole terrestrial zone comprised between the latitudes 39° 43′ 25″ and 42°. Now, Pennsylvania only occupying on this zone 5° 21′ 30″ of longitude, the area of the entire zone is to that of Pennsylvania as 360° to 5° 21′ 30″, or as 1,296,000 to 19,290; which gives for the surface of Pennsylvania 3690.48 square leagues, of 20 to a degree. It is evident, that this calculation might be abridged, if we knew, by the tables, what is the surface of a quadrilateral comprised between two meridians and two parallels, distant each by one degree, or half a degree: these quadrilaterals being counted, a simple multiplication would give the result required, allowance being made for the value of the incomplete quadrilaterals, which is easily estimated.

Geometers will perceive, that these valuations are rigorously exact, only on the supposition of the earth being spherical. The inequality of the degrees, which results from the ellipticity of the earth, occasions a slight difference between the area of a zone taken on a spheroid, and another taken on a sphere. But this difference, which depends on the quantity of the total depression of the globe, is very insensible, and amounts on a zone of 100,000 square leagues, under a mean latitude, only to 2 or 300 square leagues at most. Moreover, the geometers who have proposed algebraic formulæ to calculate the surface of the zones of the ellipsoid, and who have promised to publish tables calculated according to those formulæ,[c] are of opinion that the irregularities of the terrestrial spheroid are not yet sufficiently known to be determined exactly.

We have considered the globe under its principal geometrical relations, and it remains for us, according to the ancient custom of geographers, to show how various elementary questions are resolved by means of the artificial globe. But our readers are aware, that exact solutions of these problems can only be found by calculation; and besides, the questions commonly solved by the globe, are mostly either too vague or too foreign to geography to deserve any mention in this work. We shall confine ourselves to some short indications.

To find on the artificial globe the latitude of any ter-

[a] Klügel, Annuaire Astronom. de Berlin, pour l'An 1774, p. 173. Comp. Mayer, Introd. Complète à l'Art de Tracer des Cartes Géographiques, &c. p. 192. (en All.)

[b] The longitudes are here geographical. It should be, from 2° E. (of Washington,) to 3° 22′ 30″ W., if both E. and W. longitudes are reckoned.—P.

[c] De Zach. Correspond. i. 181—184. Pasquich. ibid. 443; ix. 301—308. Comp. Klügel, Annuaire Astron. Berlin, 1790, p. 243, *sqq.*

restrial place, the globe must be made to turn round its immoveable axis till the fixed meridian be brought on that place; and the degree marked on the meridian at that point will give the latitude of the place. The longitude of the same place will then be found on the equator, at the point where this circle passes under the meridian. If we wish, on the contrary, to determine the position of a place, the longitude and latitude of which are known, we have only to make the point of the equator, which is at the given longitude, pass under the meridian, and, taking on the meridian the same latitude, we shall have the geographical position of the place.

The dial, which is commonly adapted to the north pole of the globe, serves to show the hour in one part of the earth when it is noon in another; for, by placing the latter under the meridian, after having fixed at noon the needle of the dial, and making the globe turn till the meridian is on the place, the hour of which is required, the needle will indicate on the dial the hour wanted: it is *afternoon* if the globe has been turned to the east, and *forenoon* if it has been turned to the west.

If we wish to know the length of the longest day for all the points of a hemisphere, the northern, for example, we must place the meridian, so that the border of the arctic polar circle touches the horizon of the globe: this horizon will then be confounded with the circle of illumination. If we bring into the meridian any point whatever of the proposed hemisphere, and then fix the needle of the polar dial at twelve, and make the globe turn towards the east till the point marked enters into the horizon, the needle will stop at the hour at which this point passes from the enlightened to the obscure part. The number of hours gone over on the dial will be the half of the duration of the day required. By placing the pole nearer the horizon, we shall give this circle the position which the circle of illumination takes in the times which precede and follow the solstices, and we shall find, as above, the length of the day in each country. In this position of the globe, all the points which are at the same time on the western border of the horizon, are those which see the sun rise at the same moment that those on the eastern border see it set.

The directions of the winds with respect to the meridian line, and the names assigned to them, are generally marked on the horizon. By this means we may ascertain the position of a place with respect to the sun, at the moment when it appears to rise or set, by observing on what point of the horizon the given place passes from the obscure to the enlightened part, or from this into the other. The globe, thus turned, affords the means of representing physically all the phenomena of the annual motion of the earth. It is sufficient to put in a dark room a globe with a taper, which answers perpendicularly to the centre of the horizon, and at a pretty considerable distance relatively to the diameter of the globe; we shall then obtain the same phenomena as the sun produces during the rotation of the earth, according to the different positions which the axis of the earth takes with respect to that luminary.[a]

The distance of two places is measured by placing one of those points on the meridian, then screwing over it the fixture of the circle of heights, and making this arc of a circle turn round its fixture, till it passes by the other point proposed. The number of degrees and parts of degrees marked at this point being reduced into itinerary measures, will give the distance required.

If we wish to know on what line one of these places is situated with respect to the meridian of the other, we must first place the globe so that the second point may answer to the centre of the horizon, that is to say, we must *rectify* the globe for that point. This is done by taking its latitude, and making the meridian move in its *encastrement* with the horizon,[b] till the elevation of the nearest pole is equal to this latitude. The horizon is then, with respect to the globe, in the position which the rational horizon of the place proposed, occupies on the earth. The globe being thus rectified, the fixture of the circle of heights is brought back on the place in question, and is afterwards made to pass by the first point. The number of degrees and parts of degrees comprised on the horizon, are then counted from the circle of heights to the meridian, either on the north or south side, and we have the measure of the angle formed with the meridian by the arc of the great circle which joins, by the shortest way, the two points proposed.

The problem of finding the duration of the longest day for any place, may also be resolved by substituting the rational horizon of the place for the circle of illumination. For this purpose the globe must be rectified for the place in question, which must be placed in the meridian; the needle of the polar dial must be placed at XII, and then the degree on which the declination of the sun at the proposed moment falls, being marked, the globe must be turned till the point which corresponded to that degree of the meridian is in the horizon. The number of hours which the needle has passed over the dial, will be the number of those which elapse between the passage of the sun to the meridian, and its rising or setting. It is plain that the point taken under the meridian, at the same distance from the equator as the sun, goes over on the globe the same route as that luminary. The same process would make known the time that would elapse, in any place whatever, between the passage to the meridian, and the rising or setting of a heavenly body, whose declination is given; only the point that answers to this declination must be marked on the meridian. To determine the duration of twilight, we must trace, by means of the circle of heights, 18° below the horizon, a circle parallel to it, and determine the instant when the point taken on the globe to represent the sun, reaches that circle.

All these problems would be more easily explained if our globes were constructed after the new method proposed in part by G. Adams,[c] but executed and perfected by Covens.[d] Our readers will be able to judge of it from Fig. 18, of which we will give a short explanation. The great circular support ABC, which in

[a] Keil, Institut. Astron. p. 89.

[b] In its groove in the horizon.—P.

[c] *G. Adams*, Treatise describing the construction and use of new Celestial and Terrestrial Globes, Lond. 1766.

[d] Covens, Hanleidung, &c. (Introd. à la Connaissance des nouveaux globes, &c.) Amsterd. 1802. Comp. Van Beck-Calkoen, in Zach. Correspond. xiv. 270.

common globes represents the horizon, here represents the ecliptic. On this broad band are two divisions, consecrated, one to the motions of the sun, the other to those of the moon. In the first we observe a subdivision indicating the 365 days of the common year, and another for leap year. A small artificial sun moves at will on the ecliptic. The exterior division of the ecliptic shows the longitude and latitude of the moon for each day of her *age*. The great brass circle PNM, perpendicular to the ecliptic, is a meridian circle, and especially the *colure of the solstices*. The axis of the terrestrial globe is fixed in this circle at the points FK, and inclined on the ecliptic under an angle of 66° 32′. In the poles of the ecliptic at the points L and G, rise two pins which bear a circle of celestial latitude. To this moveable circle are attached two stars, also moveable, and which can be placed under any celestial latitude or longitude we please. The semicircle FOPI, is the half of a circle of declination. EBD is the celestial equator, which forms with the ecliptic an angle of 23° 28′. These are the celestial circles which do not turn with the globe, and which represent, as it were, an abridgment of the armillary sphere. On the globe itself, is a moveable semi-meridian RTQ. It is divided into degrees, counted on one side from the pole to the equator, and on the other in the inverse order. A great circle, VSW, is so fixed as constantly to preserve a perpendicular position on the meridian RTQ, at the same time that it may be made to coincide therewith,[a] it serves to represent the rational horizon of any place whatever. Almost on the globe itself, in the plane of the equator, is a horary circle XYZ, attached to the meridian. The moveable sun performs the functions of the needle in the common globes.

It is easy to conceive the advantages of this new construction. In the first place, it gives a much clearer idea of the horizon, as being a circle independent of the motion of the earth. To *rectify* the globe, or to place it at the height of the pole of a place, it is sufficient to bring the proposed place under the meridian RTQ, and then to push the horizon VSW to a distance of 90 degrees. On this globe the celestial circles are better distinguished from the terrestrial; the annual motion of the sun is better represented; in short, students will derive, from the study of such a globe, more precise ideas of the relations of our planet with the heavenly bodies which surround it.

We might here indulge in a historical digression on the successive improvements in the construction of globes, from that of Roger, II. immortalized by the commentary of Edrisi, down to the time of Blaeuw and Coronelli, who first made globes of elegant forms and considerable dimensions. We might investigate the origin of these instruments which were known to the ancients; inquire whether Atlas was the inventor of them, and whether the two famous capitals of the temple of Solomon[b] were a pair of globes;—whether Albert Durer, or Henry Glarean, first taught the art of drawing and engraving spherical segments, and of pasting them on a ball:[c] we might show that the means of multiplying globes by engraving must have been generally known in 1530, since the cosmography of Gemma Phrysius was accompanied by a similar instrument, as our modern books are with an atlas;[d]—and finally, we might be allowed, perhaps, to describe the most famous terrestrial globes, such as that of Coronelli, framed at the expense of the Cardinal d'Estrées, and placed first at Marly, then in the king's library at Paris;[e] that of Gottorp, composed by Olearius between 1654 and 1664, and which Peter the Great brought in a frigate, to adorn his new capital; that of Cambridge, which is 18 feet in diameter, being six feet more than any of the preceding; and many others, celebrated for their size or magnificence. But these historical researches would lead us too much from our subject. We shall only remark, that the copper globe placed in the library of the Institute, though incomplete with respect to modern discoveries, leaves all other great globes very far behind in the beauty of its execution. Bonaparte had one made, now in the Thuilleries, which does great honour to MM. Poirson and Mentelle.

Among the globes that come into the market, we distinguish those of Lapic and Poirson at Paris, made of a homogeneous mass of *papier maché*. Those of Sotzmann, published by Frantz at Nuremberg, are also esteemed, as well as those of Cary and Jones of London.

Besides armillary spheres and artificial globes, there are two other instruments of which the use may be recommended to young persons. One is the *Planisphere* of Fortin, which represents the true planetary system in a new and more perfect manner; one can even perceive in it the ellipticity of the orbit of the earth. The other is the *geocyclic machine* of Loysel, calculated to demonstrate the motion of the earth. The use of it is explained in Mentelle's Elementary Cosmography. A taste for study should be excited in youth by this sort of scientific sports; but to expect a detailed description of them here, would be to appreciate but imperfectly the object of our work.

[a] A great circle, VSW, is so attached to the meridian, RTQ, that it may be moved on it at pleasure, yet always remain perpendicular to it.—P.

[b] Fabricii, Bibl. Græca, lib. iv. c. 14. p. 464. Hauber, Hist. Des Cartes Geog. 57, and Supplem. 38, (en Allemand.)

[c] Zach, Corresp. xiii. (1806,) 156. Glareanus, De Geogr. c. 19. 1527. Vaugondy, Geogr. Institut. p. 359.

[d] Gemma Phrysius, De Prin. Astron. et Cosmogr. deque usu Globi 1530. On the title: *Veneunt cum globis;* Lovanii, &c.

[e] De la Hire, Descript. des Globes de Marly, 1703.

WESTERN HEMISPHERE.

W.m Chapin Sculp.t N. York

Published by Samuel Walker, Boston.

EASTERN HEMISPHERE.

Published by Samuel Walker, Boston

BOOK IV.

Continuation of the Theory of Geography. Of Geographical Maps. Of the Stereographic, Orthographic, and Central Projection.

LARGE globes are costly and inconvenient instruments; small ones do not exhibit sufficient details. It became necessary, therefore, to have recourse to pictures, which, on a plane surface, might give a representation of the globe and its parts. These representations embrace either the whole earth, or a part of the world, or a single country. In the first case they are called *maps of the world*, and when they have a circular form, *planispheres;* those of the second class are called *general maps;* the others are *special maps*. Among the special maps, some represent a province on a large scale, with all its remarkable places; these are *chorographic maps*. If the designer has entered into all the details of the nature of the ground, or has even traced out insulated habitations, and the direction of roads and rivers, they are *topographical maps*. It is plain that these sort of maps must necessarily embrace a small district, and approach insensibly to *geometric plans*. Custom sometimes confounds these denominations. Geographical maps, properly so called, are also distinguished from those that are appropriated to a particular use; such are *hydrographic charts*, destined for mariners, *mineralogical maps*, and others.[a]

The figure of the earth prevents the possibility of giving a general picture, in which the distances of places, and the relative extent of regions, might be preserved in their mutual relations. There are curved surfaces, which can be extended on a plane without rent or duplication, and which for this reason are called *developable surfaces;* such are those of cones and cylinders: but others, like those of the sphere and spheroids, cannot be so extended. The earth being a spheroid, its surface cannot coincide rigorously with a plane; and thence results the impossibility of marking on a map, at the same time, and in their natural relations, the extent of countries, the distances of places, and the similitude of configurations. Geographers are obliged to have recourse to various constructions, to represent, at least in an approximative manner, each of these relations in particular.

These constructions have received the name of *projections;* a name applied in general to designs, the object of which is to indicate on a plane the dimensions of space, and of the bodies it contains. They are of two kinds: some are real *perspectives* of the globe, or of parts of its surface, taken from *different points of view*, and on different planes; the others are only a kind of developments, subject to approximative laws, and appropriated to the relations which it is wished to preserve in preference. It is of the projections in perspective that we shall now occupy ourselves in this Book. Let us first explain the general theory of projection, as well as it can be done without the help of the higher geometry.[b]

Projection, in the language of perspective, signifies the representation of an object on the perspective plane, or the plane of the picture. For, in every picture, there is supposed between the object to be represented and the point of view, a plane which intercepts all the rays of light directed from each of the visible objects to the point of view. Then we conceive a multitude of points of intersection of those rays with the plane of the picture. The assemblage of these points is the image of all that lies under the view of the spectator. Each point of intersection is the perspective of the point whence emanates the ray of light, which having traversed the perspective plane, terminates in the point of view. In order that the perspective of a plane figure, as of a square, of a circle, &c. be a similar figure, two things are requisite; *first*, that the point of view should be in the axis of the figure; *secondly*, that the plane of the picture be perpendicular to that axis. If the plane to be represented is in another perpendicular to that of the picture, it can only be represented by a straight line. A solid cannot be seen entirely in a single point of view, two at least are necessary. In order that a sphere be divided into two equal surfaces by simple perspective, the point of view must be at an infinite distance. The straight line, drawn from the centre of the globe to the point of view, is the axis of the great circle which separates the visible hemisphere from that which is not.[c] It is called the *optical* axis.

The projection of the sphere is commonly divided into *orthographic* and *stereographic*.

Orthographic projection is that where the surface of the sphere is represented by a plane which cuts it through the middle, the eye being placed vertically at an infinite distance from the two hemispheres. Here are the principal laws of this projection:[c] 1*st*, The rays by which the eye sees at an infinite distance are parallel. 2*d*, A right line perpendicular to the plane of projection, is projected by a single point, which is that where this line cuts the plane of projection. 3*d*, A right line which is not perpendicular to the plane of projection, but parallel or oblique to it, is projected by a straight line terminated by perpendiculars brought on the plane from its extremities. 4*th*, The projection of the line is the greatest possible when it is parallel to the plane of projection. 5*th*, Thence it follows evidently, that a line parallel to the plane of projection is projected by a line that is equal to it; but that, if it is oblique to the plane of projection, it is projected by a line less than it. 6*th*, A plane surface, if it is perpendicular to the plane of projection, is projected by a simple straight line; and this straight line is the line itself, where it cuts the plane of projection.

[a] Mayer's Complete Introduction to the Art of Tracing Geographic, Hydrographic, and Celestial Maps, &c. Erlang. 1794, (in German.) Puissant, Traité de Topog. b. ii. p. 92—152. Comp. Rob. Vaugondy, Instit. Geograph. part ii. &c.

[b] See Euler, Acta Acad. Petropol. i. p. 1. Lagrange, Mem. de l'Acad. de Berlin, 1779. Molleverde, Analyse de la Projection Stéréographique, dans Zach, Correspond. xiv. 437, 528, *et seq.*

[c] D'Alembert, Encycl. Method. art. *Projection*.

7th, Thence it is evident, that the circle, the plane of which is perpendicular to the plane of projection, and which has its centre on that plane, ought to be projected by the diameter which is its common section with the plane of projection. *8th*, It is also evident, that an arc of a circle, the extremity of which would answer perpendicularly to the centre of the plane of projection, ought to be projected by a straight line equal to the sine of that arc, and that its complement is projected by a line which is simply the versed sine of that arc. *9th*, A circle, parallel to the plane of projection, is projected by a circle that is equal to it; and a circle oblique to the plane of projection is projected in an ellipsis.

Stereographic projection is that where the surface of the sphere is represented on the plane of one of its great circles, the eye being supposed at the pole of that circle. In the stereographic projection the globe is considered as a transparent solid. The hemisphere represented is that which is opposed to the hemisphere in which the eye is supposed to be. Here are the principal laws of stereographic projection.

1st, Every great circle, passing by the centre of the eye, is projected in a straight line. *2d*, A circle placed perpendicularly opposite the eye, is projected by a similar circle. *3d*, A circle placed obliquely with respect to the eye, is projected by another circle, the radius of which increases in the ratio of the obliquity. *4th*, If a great circle is projected on the plane of another great circle, its centre will be on the line of measures, that is to say, on the projection of the great circle, which passes through the eye, and which is perpendicular to the circle to be projected, and to the plane of projection. The centre of the projected circle will be distant from the centre of the primitive circle, or of projection, by the quantity of the tangent of its elevation above the primitive plane, or the plane of projection. *5th*, A small circle will be projected by another circle, the diameter of which (if the circle to be projected surrounds the pole of the primitive circle) will be equal to the sum of the semi-tangents of the greatest and smallest distance from the pole of the primitive circle, these tangents being taken each in the line of measures of the same side of the centre of the primitive circle. *6th*, In the stereographic projection, the angles which the circles make on the surface of the sphere are equal to the angles which the lines of their respective projections make among themselves on the plane of projection.[a]

Setting out from these principles, methods have been found for tracing maps of the world according to either of these projections.[b]

Three sorts of stereographic projections are in common use: *1st*, That on the plane of the equator, called *polar*, because the eye is supposed to be at one of the poles. *2d*, That on the plane of a meridian, commonly that of the Isle of Ferro, which cuts the globe into two *hemispheres*, one containing America and the other Europe, Asia, and Africa. *3d*, That on the plane of the horizon of any place whatever.

Let us first explain the method of tracing the polar projection. Supposing the eye at one of the poles, the picture will be itself the plane of the equator; the meridians will be projected by straight lines, and the circles parallel to the equator by concentric circles.

The meridians are traced as follows: Let AP. fig. 19. be the radius representing that of the terrestrial sphere, and ABCD one of the great circles of that sphere. The centre P being taken for the projection of the optical axis, or of the point of view placed at the pole, the circumference ABCD will be the projection of the equator. But as the planes of the meridians all cut each other in the axis of the earth, which is perpendicular to ABCD, the projection of the first meridian may be represented by any diameter whatever; for example, by AB. Now, if we divide the semi-circumference ACB into 20 equal parts and if, through all the points of division, we carry diameters such as (1) (30), (2) (40), and so on, they will be the projections of the meridians corresponding with the longitudes A (1), A (2); the difference of longitude of the two meridians, traced in this way, will be 10 degrees, new French measure, or 9, ancient, since the arc AC, which is the quadrant, and equal to 100 new degrees, or 90 ancient, is divided into 10 equal parts.

To obtain the projection of the parallels to the equator, spaced from 10 to 10 degrees, we must raise the diameter CD perpendicular to AB, and draw the straight lines D (1), D (2), D (3), and the following, which will cut the diameter AB at the points d', d'', d''', and so on. Then, by making the radii Pd', Pd'', turn round the point P, as the common centre, the circles will be described which are the required projections. In this method D is taken for a point of view, and the points d', d'', d''', are the stereographic projections of the corresponding points (1), (2), (3), belonging to the parallels of the 10th, 20th, 30th degrees; for if we conceive that the circle ABCD, turns round the diameter AB, till it makes a right angle with the plane of the figure, the radius PD will be perpendicular to this plane, the point C will be the pole opposed to the point of view D, and the arcs A (1), A (2), &c. will be the respective latitudes of the parallels to the equator; consequently the traces A, d', d'', &c. of the visual rays DA, D (1), D (2), will represent on the perspective plane, the points A, (1), and (2).

Let us pass to the stereographic projection on a meridian. In this method, the point of view, always placed in the centre of the hemisphere, opposed to that which is to be represented, is on the circumference of the equator, and the projection of this great circle is a straight line perpendicular to the axis of the poles of the earth.

The meridians are projected in the manner we shall now indicate, by making use of Fig. 20. Let AB be the projection of the equator, PP′, the axis of the earth, and C the centre of the map, or the projection of the point of view on the picture, on the plane of the meridian APBP′, the meridian we shall consider here as the first. All the meridians having PP′ for their common section, and their projections being circles, the circumferences of which necessarily pass through P and P′, it follows that their centres are on the right line AB. Let us divide as before the arc AP into ten equal parts, let

[a] D'Alembert, loc. cit.

[b] Puissant, Topographie, 117, *sqq*.

Fig. 19. *Page 38.*

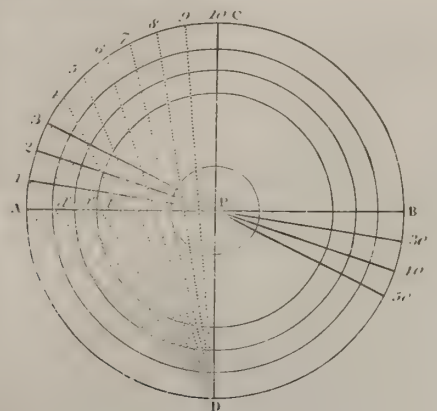
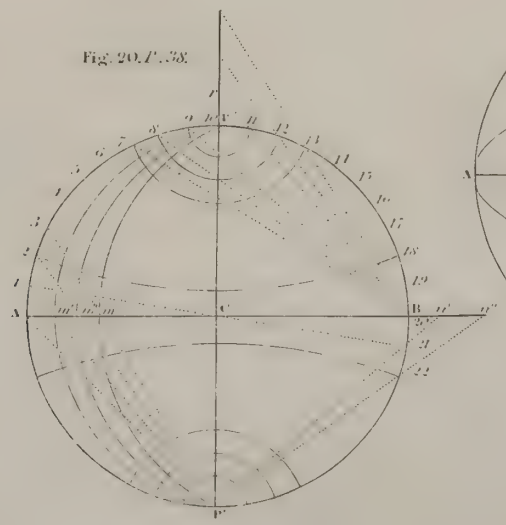


Fig. 20. *P. 38.*



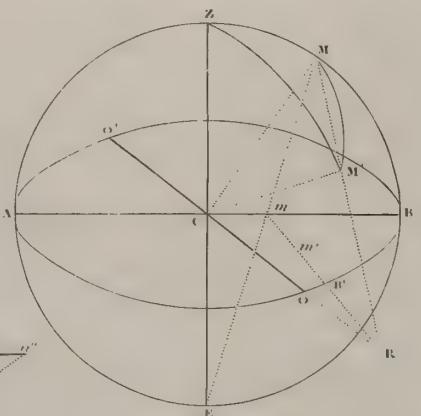
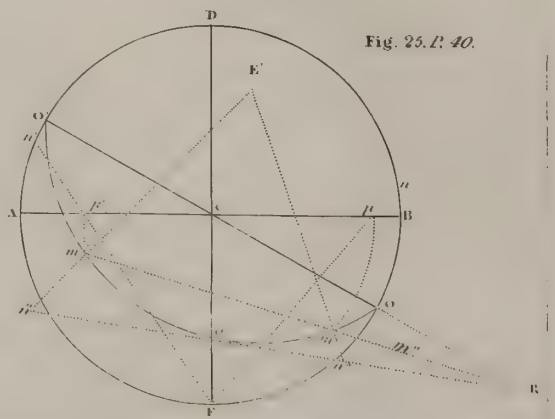


Fig. 24. *P. 40.*

Fig. 25. *P. 40.*



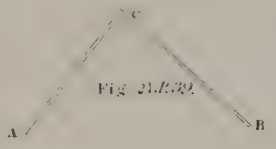


Fig. 21. *P. 39.*

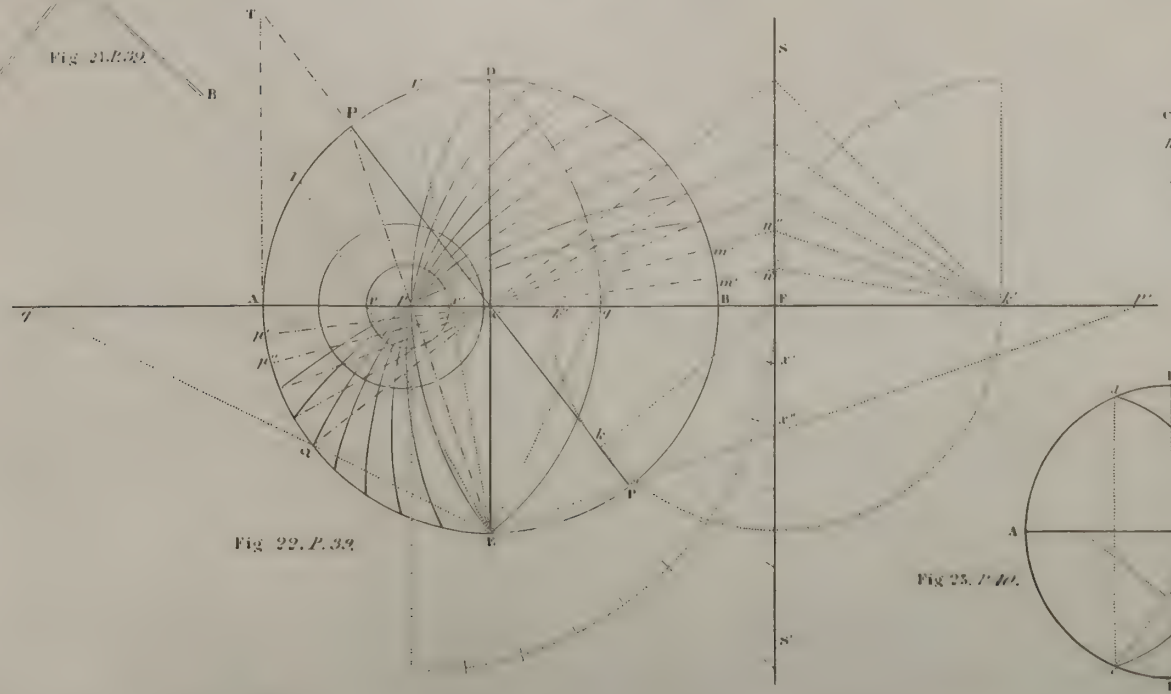


Fig. 22. *P. 39.*

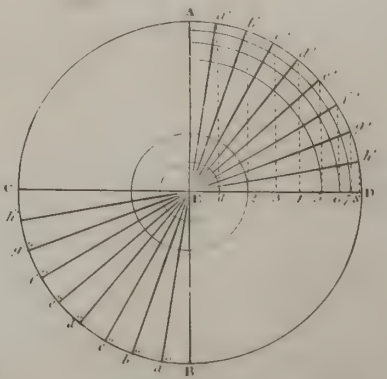


Fig. 26. *P. 41.*

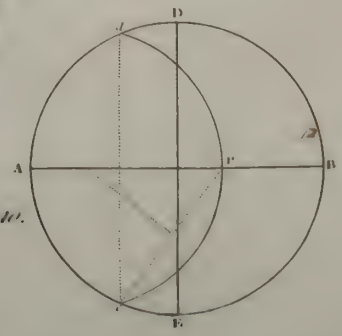
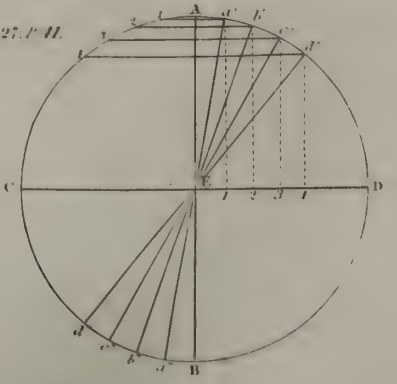


Fig. 23. *P. 40.*

Fig. 27. *P. 41.*



us draw the diameter (1) (21), and through its extremities let us bring the right lines P′ (1), P′ (21), which will cut respectively AB, which we shall prolong, if necessary, to the points m' and n'; these points will be the projections, or the perspectives of the extremities of the diameter of the meridian of the map, passing by the point, the longitude of which, with respect to the first meridian AP′, is 10 degrees, new measure. If therefore, from the middle of m' n', as a centre, with a radius $= \frac{m'n'}{2}$, we describe the arc Pm' P′, we shall have the projection of the meridian required. By repeating the same construction for the points of division (2), (3), and the others, we shall obtain the projections of the other meridians; and, by a natural consequence of the symmetry of the figure, what we have constructed in the semicircle PAP′, will serve for the other semicircle PBP′. As to the meridian, the plane of which is perpendicular to the picture APB, it will be represented there by a right line which coincides with the axis PP′.

As the length of the radii, to describe the meridians, may become too great to trace these circles by means of a compass, a very simple instrument is used, composed of two moveable rulers, AC and CB, Fig. 21, united at C by a hinge, which allows them to form any angle whatever. A pencil is placed in the centre of motion of these two rulers, the point C is made to coincide with the point m', Fig. 20; at the points PP′ are fixed two small metal points, against which the edges of the rulers are applied, the point C always resting on m'; then, without varying the angle ACB, the instrument is made to move, so that the rulers lean incessantly against the points PP′. The pencil C then describes the arc of the circle Pm' P′, Fig. 20. The demonstration of this process is afforded by elementary geometry.

Let us now indicate the projection of the parallels. These circular curves ought to pass by the corresponding points of division, (1) (19), (2) (18), (3) (17), &c. and their centres are necessarily situated on the prolongation of the axis PP′. We may determine, for example, the centre of the projection of the parallel (9) (11), in the following manner. Draw the straight lines B (9), B (11); the first will cut PP′ at the point r', the second at the point r, and the distance rr' will be the diameter of the parallel, which is moreover determined by the three points known (9), r, (11); we have only to describe an arc, the centre of which shall be in the middle of rr', and the radius equal to the arc (9) P; it will be on the map the parallel of 90 degrees, new measure.

We shall next consider the *horizontal stereographic projection*, the most interesting application of this method. The rational horizon of any place whatever, will serve as a plane of projection; the point of view is the lowered pole of that horizon; the meridian that passes through that place is represented by a right line, and is commonly called the *principal meridian*. Now let ABDE, Fig. 22, be the horizon of a place: its centre C will be the projection of the point of view, or of the pole of the horizon. Again, let AB be the diameter which represents the principal meridian. If the angle PCA is equal to the height of the pole, and DE be perpendicular to AB, the right line PE will cut AB in a point p, which will be the projection of the raised pole of the globe. If in like manner the line EP′ is prolonged till it cuts the prolongation of AB in p', this point will be the projection of the lowered pole of the globe. The projections of the meridians which will all pass through the points pp', will have at the same time their centre on the right line SS′, perpendicular on F, or on the middle of pp'. SS′ is called the *line of centres of the meridians*. It is remarkable that the line CF is equal to AT, which is the tangent of the height of the pole. To complete the determination of the projection of the meridians, it is sufficient to find a third point.—Here is a method to find that element.[a]

The meridian whose plane is perpendicular to the principal meridian AB, cuts the horizon in the right line DE, perpendicular to AB; therefore, if from the point F as centre, and with a radius FD, we describe the arc DpE, this arc will be the projection of the meridian passing through the longitude of 100 degrees, new measure, or 90 ancient degrees, counting from the principal meridian AB. The projection of the equator does not present more difficulties; for if we raise the diameter QQ′, perpendicularly to PP′, this diameter will be that of the equator, and its projection on the map will be qq'. Consequently, if from the middle of the line qq', as centre, and with a radius $= \frac{qq'}{2}$, or equal to the cosecant of the latitude of the centre of the map, we describe the arc DqE, it will be the projection of the half of the equator. We must now recollect the principle by which the stereographic projections of two great circles of the sphere, make between them the same angles as the real planes of those circles. Hence is derived this geometric construction: From the point p as a centre, and with an arbitrary radius,—with a radius equal, for example, to pF, let us describe a circumference, and divide it into 40 equal parts, setting off from AB, (if we wish to trace, as before, only 40 meridians,) and through all the points of division radii must be brought, whose prolongations will meet the line SS′, or the line of centres in different points x', x'', &c. These points will be the centres of the projections of the meridians. The practical employment of this process being often too embarrassing, on account of the increasing size of the radius R, we may determine, by the means we are going to indicate, the points where the meridians meet the planes of projection.

From any point whatever taken on the line AB, or its prolongation, from the point F, for example, is brought down perpendicularly Fk, on the line PP′, making as we know already, an angle equal to the height of the pole, and the length Fk is carried from F to k': then from this last point as centre, and with a radius $=$ Fk', or with any other radius taken at pleasure, but rather large, a circumference is described, which is likewise divided into 40 equal parts. After this, secants k' n', k' n'', k' n''', are brought through all those points of divi-

[a] Puissant, Topogr. p. 123.

sion; the extremities n', n'', n''', of those secants, terminated in the right line SS′, are on the very traces of the planes of the meridians; drawing therefore right lines, which pass through the centre of the map, such as n' Cμ', n'' Cμ'', n''' Cμ''', the diameters n' μ', &c. will be the required traces of the meridians; and as, moreover, they must all pass through the pole p, we shall have three points of each meridian, for example, μ''', p, n'''; the meridians therefore will be easily described according to one of the processes previously indicated.

In practice, as there commonly is not space enough round the map to perform this construction, founded on the principles of descriptive geometry, Fk may be carried from F to k''; this point will then be what is called the *centre divisor*; in other respects, the processes are the same.

Let us now examine how parallels to the equator are described. Their planes being perpendicular to the principal meridian AB, we shall obtain the diameters of their projections, as we obtained those of the equator, that is to say, after having divided the circumference ABDE into 40 equal parts, setting out from the point P, we draw, two and two, the right lines (1) E, (1′) E; and the interval vv' intercepted between these right lines, and taken on the meridian AB, will be the diameter of a parallel. In the present, the parallel vv' belongs evidently to the 80th degree of latitude, since the arc AP measures the height of the pole. But for the parallels which are very distant from the superior pole p, the construction we have just indicated can no longer be put in practice, because the point v would then be too far from the centre of the map. To obviate this inconvenience, we may trace the intersections of the planes of the parallels, with the plane of projection ADBE, intersections which are necessarily parallel to the diameter DE, and distant from it by a sum equal $\frac{\text{sin. lat. of the parallel}}{\text{cos. height of the pole}}$. When the latitude is southern, the pole p being the northern pole, this value becomes negative; and instead of bringing it on the side of AC, it is brought on the side of CB. Thence it follows that if at any distance whatever from the right line DE, (fig. 23.) the parallel line d e is drawn, the points d and e common to that parallel and to the circumference ADBE, will belong to the required parallel: but this parallel passes at the same time through a point such as v determined by the preceding method; we have therefore the three points necessary for tracing a circumference.

There are other methods of explaining the three stereographic projections,[a] but we prefer indicating in a few words the advantages and defects of this sort of projection. It is sufficient to cast one's eyes on a map of this kind, to perceive that the quadrilaterals comprehended between two meridians and two consecutive parallels, increase in extent in going from the centre to the circumference. This increase results from the obliquity which the visual rays take, on parting from that perpendicular to the picture, called the *optical axis*. It follows thence that the regions placed towards the borders of the hemisphere have a much more considerable extent than if they were at the centre, and that we are led into error whenever we compare them with those which occupy that part. For example, the point of austral Africa, appears much broader than on a globe, and in Nova Zembla the distances, south and north are rendered by spaces much larger than the same distances are in India. This inconvenience, of no consequence to learned geographers, may lead pupils to false ideas; but this risk would be diminished, if, in teaching, care were taken to explain the qualities of stereographic projections, and to place under the view of beginners the polar, equatorial, and horizontal planispheres, the defects of one always disappearing in the other.

The stereographic projection does not admit, in general, the employment of a rectilineal scale for comparing the respective distances of places, which are measured on the arc of a great circle, joining these places: but we may always, by means of the graduation itself, measure the distance between the centre of the map, and any point whatever, and consequently we may know, on the horizontal projection relative to Paris, for example, the distance of that town from all the other points of the globe. This property results from this, that all the great circles which pass through the centre of the map, cutting each other in the optical axis, have for perspective, right lines drawn through that centre, and admit of a graduation similar to that which is observed on the equator of maps of the world, constructed on the plane of the meridian.

If we wish to measure the distance of two points on a stereographic map, we may (Fig. 24.) make use of the following construction.[b] Let Z be the zenith of a place, C the centre of the horizon, or the projection of Z, and ZMB, XMB′ the respective verticals of the two points M,M′, given on the globe by their longitudes and latitudes. These points will have evidently for perspectives or traces m,m', supposing the eye in E. But if we prolong the right lines MM′, mm', they will meet in a point R, and the right line COR will mark on the plane of projection CBB′, the trace of the plane MCM′ of the great circle to be projected. Therefore the four points m, m', O, O′, are on the projection of the great circle which passes through MM′; thus this projection, which is itself a circle, will be entirely determined. This being laid down, we may trace the shortest distance on the map, in the following manner. Carry Cm (Fig. 25.) from C to μ, and Cm' from C to μ'; draw the right lines Eμn, Eμ' n': then on mm' construct the triangle m' E′ m, so that m E′ be equal to μ E, and m' E′ to μ' E; next, on the prolongations of E′ m' and E′m, draw μn from m to n'', and μ' n' from m' to n'''; finally, let the common section R of the two right lines m' m and n''' n'', be determined, and draw the right line RCO, which will be the trace required. We may now trace the arc of a circle O′ m' vm O, of which the portion m' v m is the shortest distance. The number of degrees contained in the shortest distance, will be ascertained by considering the right line n''' n'', which is equal to MM′ (Fig. 24. and 25.) as a chord of the circumference ADB.

The stereographic projection was not known to the ancients. The first map of the world of this kind is found in a work of the beginning of the 16th century,

[a] R. Vaugondy, Instit. Geogr. l. c.

[b] Puissant, Traité de Topogr. p. 127.

Fig. 28. *Page 27.*

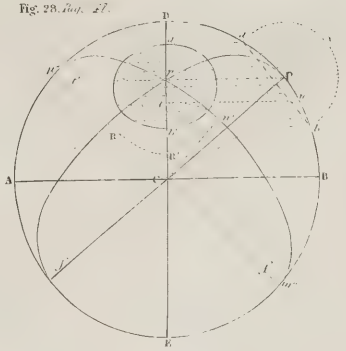


Fig. 29. *P. 42.*

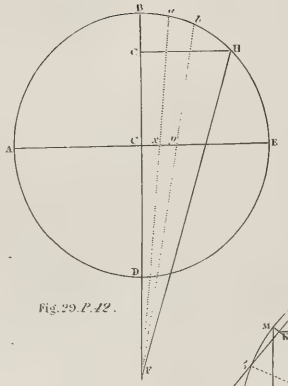


Fig. 30. *P. 42.*

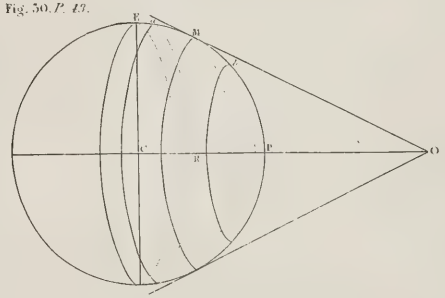


Fig. 31. *P. 43.*

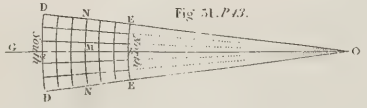


Fig. 32. *P. 44.*

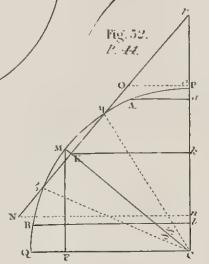


Fig. 33. *P. 44.*

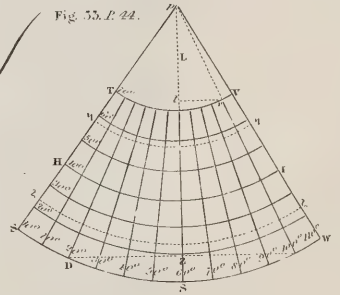


Fig. 34. *P. 42.*

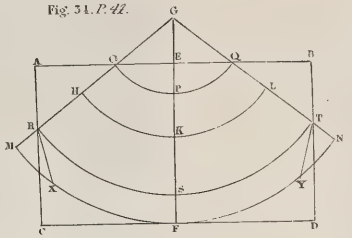


Fig. 35. *P. 45.*

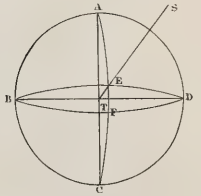


Fig. 36. *P. 45.*

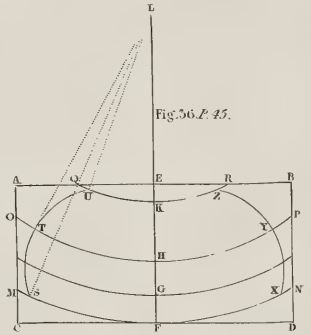


Fig. 37. *P. 45.*

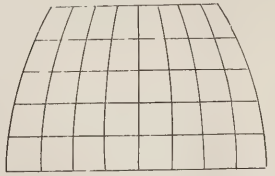


Fig. 38. *P. 46.*

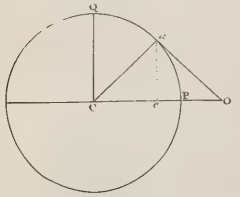


Fig. 40. *P. 46.*

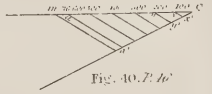
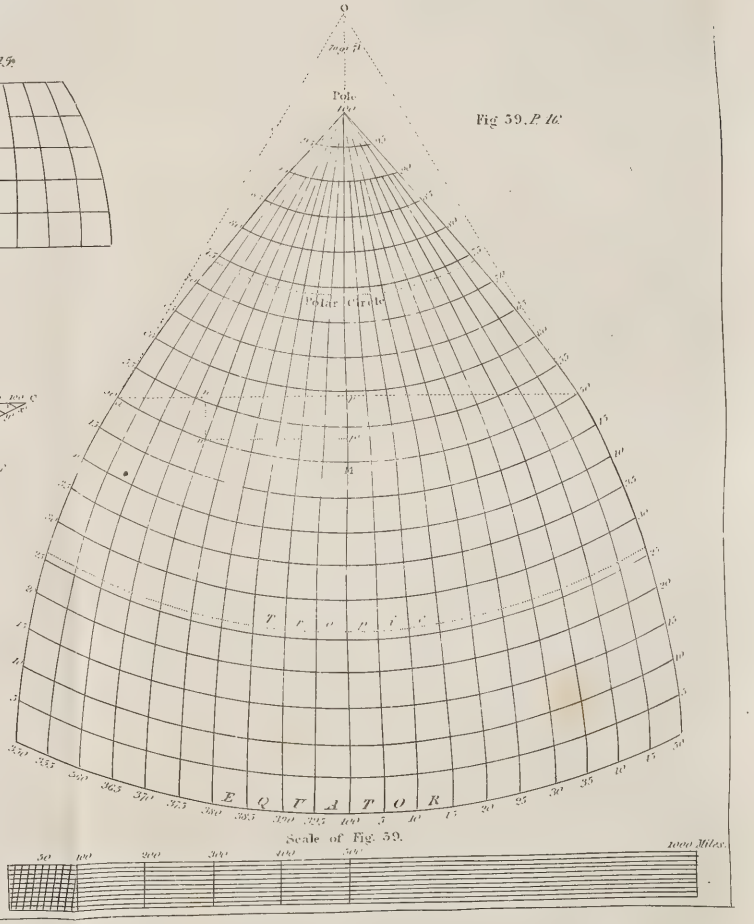


Fig. 39. *P. 46.*



Scale of Fig. 39.

by the same *Werner* of Nuremberg, who gave the first indication of the method of lunar distances.[a] He was indebted for the idea to his master, *Stabius* the astronomer.[b] The use of this projection appears to have been general 150 years later. *Varenius* marks its three modifications. *Hesius*, a German geographer, who lived in the beginning of the 18th century, applied stereographic projections to special maps. This method, laborious, but favourable to exactness in the details of position, is little followed in France, where the stereographic projection is reserved for maps of the world.

We shall now proceed to the explanation of *orthographic projections*, which might also be called *planetary*, since their principal object is to show the direct image of the half of the globe, the eye being supposed at an infinite distance, that is to say, great enough for all the visual rays to be reckoned parallel. As these rays are perpendicular to the plane of projection, while the lateral parts of the sphere present themselves more and more obliquely to this same plane, it is easy to perceive, even without demonstration, that this projection, offering the contrary defect of the stereographic, makes the space diminish from the centre to the circumference. This diminution, which is infinitely greater than that remarked in the preceding projection, gives to the extremities of a planisphere orthographically projected, an aspect too much disfigured to fulfil, in general, any of the objects proposed by geography. This is a sufficient reason for indicating here only very briefly what regards orthographic constructions.

Figure 26, indicates the polar projection. The lines AB and CD, are two meridians which cut each other at right angles in E, which is the projection of the pole, and the centre of the map. The circumference ABCD is the equator, on the plane of which the map is projected. This circumference is divided into equal parts, from 10 degrees to 10, or from 5 to 5; the diameters which pass through the points a' a'', b' b'', &c. and by the centre E will be the meridians. Let fall from the points a', b', &c. perpendiculars on the diameter CD; they will determine the radii E 1, E 2, &c. with which you will describe the circles parallel to the equator.

In the projection on a meridian, the process is constructed in the following manner. Draw the lines AB and CD (Fig. 27.) cutting each other at right angles; one will be the middle meridian, the other the equator. Their intersection E is the centre of the plane of projection, circumscribed by the meridian ABCD. This circumference must be divided into equal parts, then unite the points of division, the diameters a' a'', b' b'', &c. will be the common sections of the meridians, with the plane of the equator. The angles a' ED, &c. will mark the inclination of these meridians on the plane of projection. Now let down from the points a', b', &c. on the radius ED, the perpendiculars a' 1, b' 2, &c. which will be the sines of the angles of inclination of these meridians measured on the equator; the parts E 1, E 2, &c. will be the versed sines of those inclinations, and consequently the lesser axes of the ellipses, which are to represent the meridians. The line AB, the projection of the axis of the globe, is the greater axis of those ellipses. The parallels to the equator are very simply traced; it is only necessary to join by a right line the points of division of the circle ABCD, equidistant from the diameter CD, and which are on the same side. This diameter being the projection of the equator, the cords a' (1), b' (2), and others parallel to it, will be the projections of the parallel circles.

The inspection of the figure shows the inconveniences of this projection; namely, the extreme narrowing of the lateral parts, and the obliquity, always increasing, of the angle under which the parallels cut the meridians. Nevertheless it is at the same time evident, that such a planisphere presents a more striking image of a spherical body than a stereographic planisphere does; thus beginners, who cannot always study on a globe, by using from time to time a map projected orthographically, might perhaps imbibe more profoundly the idea of the sphericity of the earth. This advantage is still more sensible in the horizontal orthographic projection of which we are going to treat.

The meridians, in this projection, are ellipses, the greater axes of which coincide with the traces themselves of the planes of these meridians. These traces are determined by the same methods as those we have indicated for the stereographic horizontal projection. It only remains therefore to show how the smaller axes are obtained. Let (Fig. 28.) the angle DCP be equal to the height of the pole; let moreover m'' μ'' be the trace of a meridian, and DE the projection of the principal meridian. To have the orthographic projection of the raised pole P, let fall on CD the perpendicular P p, and you will have the point p. Now, to have the angle which the plane of the meridian μ'' pm'' makes with that of the picture, or with the horizontal plane, we let down from the point p the right line p R perpendicular on μ'' m''; p R$'$ is made equal to p R, and the right line R$'$ P is drawn, which forms with DE the angle required. The trigonometric relations of this angle, and of its cosine, then give this geometric construction: Draw C n parallel to R$'$ P, and from the point n the right line nt parallel to P p; describe from the point C with a radius equal to C t, an arc tn', terminated at the meeting of C n', drawn perpendicularly to the trace or to the greater axis μ'' m''; then the line C n will be the orthographic projection of the radius C n, or the smaller axis required. We have then only to describe the ellipsis, the two axes of which are given.

The projection of the parallels, abstracting the calculations which serve as its foundation, may be effected in the following manner. Supposing it is wished to project the parallel, the distance of which from the raised pole is measured by the arc P b or P a. From the points a and b are let fall on the principal meridian DE, the perpendiculars aa', bb', and the line a' b' will be the smaller axis of projection of the parallel to be described. To find the greater axis, the cord ab is divided into an even number of equal parts; on DE are sought the projections of all the points of division, as has been done for the points a and b; then, after hav-

[a] J. Werner, de quatuor orbis terrarum figurationibus, ad calcem. Ptolomæi geograph. lib. i. vers ab eodem.

[b] Comp. Weidler, Hist. Astron. cap. xiv. nos. 3 and 4.

ing drawn through those same points ordinates[a] in the semicircle $a\ x\ b$, carry the lengths of these ordinates to the correspondent ordinates of the ellipsis to be traced; by this means the principal points of this ellipsis are obtained, and the middle ordinate yx will be the semi-great axis $y'\ x'$ required.

Besides the orthographic and stereographic projection, there is a third projection in perspective called *central*. It is obtained by placing the point of view at the centre of the sphere, and taking for the picture a plane tangent to its surface. It would be useless to demonstrate how, in this case, the processes must be modified which we have given above to construct the equatorial, polar, and horizontal projections; from the point C of the figures 19—21, previously cited, we must draw the visual rays which determine the section made by the plane of the picture in the cones perpendicularly to the circles to be represented; we must take the picture parallel to that which passes through the centre and tangent to the circle ADBE. We then see that, in the projection on the plane of the first meridian, the meridians will be right lines perpendicular to the equator, which itself will be a right line; the parallels to the equator will be hyperbolas. In the polar projection the meridians will be right lines drawn from the centre of the map; the parallels to the equator, circles having their centre at that point; and in the horizontal projections, the meridians will be right lines drawn through the projection of the superior pole. The parallel of the place to which the projection relates will be represented by a parabola; those that are nearer the pole by ellipses; and the others on each side of the equator, by hyperbolas. It is plain that this projection alters still more than the stereographic, the extent of regions, in proportion as they are removed from the centre of the map. It can never represent an entire hemisphere, because the visual rays, passing through the circumference which terminates this hemisphere, are indefinite, being parallel to the plane of the picture; it may however be employed with advantage to retrace parts of the globe, the extent of which may not be very considerable; for, in this projection, all the places situated on the same great circle, are placed on the map on a right line;[b] it is susceptible of a sort of scale, the construction of which is not difficult to find. It was undoubtedly for this reason that M. Prony thought of using it in the maps of the survey of France. This projection, almost unknown in geography, is employed for sun-dials.

Such are the three principal projections of the globe which the rules of perspective admit. We see that none of the planispheres traced after these projections unites all the qualities of a perfect representation of the globe; they necessarily alter the figure of countries, either in the middle or towards the borders of each hemisphere; they do not represent spaces really equal under equal dimensions; and the same takes place for most of the distances. It is not possible neither, to obtain, either in the stereographic or orthographic projection, that places situated in a right line on the globe, that is to say, on the same great circle, should be equally represented in the map of the world on a right line. Finally, the inequality necessary in the projection of spaces does not allow us to find with ease the exact longitude and latitude of a place. Different means for modifying the stereographic projection have in vain been proposed, with a view to remedy these inconveniences. The learned astronomer De Lahire[c] proposed that the eye of the spectator should be supposed out of the globe, and distant from its convex surface by the amount of the sine of 45 degrees; that is to say, that the meridian BD, Fig. 29, being of 200 parts, it must be prolonged out of the circle ABCD by 70 parts, and then from the point F, should be drawn the right lines F a, F b, &c. whose intersection with the diameter AE would determine the small axes C x, C y, &c. of the ellipses which represent the meridians. The geometer Parent observed that, in this projection, the radius of the meridian, distant by 45 degrees from the principal meridian, cuts in reality the semi-diameter into two equal portions, but that it may still be asked at what distance the eye must be placed that all the inequalities between the divisions of the semi-diameter should be the least possible; he found that if BD is equal to 200 parts, the point of view must be taken at a distance of $59\frac{1}{2}$; but it must be placed at $110\frac{1}{2}$ if we wish the zones of the hemisphere to occupy respectively a space proportioned to that which they occupy on the globe.

Thus, these sorts of modified stereographic projections, besides losing the advantage of presenting the meridians and parallels cutting each other at right angles, cannot preserve at the same time the equality of spaces and of configurations.

It is a truth generally admitted, that all the conditions of a perfect representation of the terrestrial surface can only be united in the case of the earth's being a cone or cylinder, or in short, any body whatever of simple curvature.[d] If therefore we can find a body of this nature, which approaches nearly to the spheroid, we may substitute its surface for that of the latter, and obtain representations which will answer one or other condition of a faithful picture.—This we shall explain in the following Book.

[a] An ordinate is a right line drawn from a point of the curve to another fixed line, which makes with the latter a determined angle.

[b] Lagrange, Mem. sur les Cartes Géographiques, dans les Mem. de Berlin, 1779, p. 162.

[c] Hist. de l'Acad. des Sciences, 1701, p. 97.

[d] Lambert, Mem. sur les Mathém. Mixtes, iii. p. 105. (en All.) Euler, Mem. sur les Solides développables, dans les Novi Comment. Petropol. xvi. 2.

BOOK V.

Continuation of the Theory of Geography. Of Geographic and Hydrographic Maps by Conic and Cylyndric development. Of Projections by Proportional Parts.

Among all bodies which can be exactly retraced on a plane, the cone and cylinder have the most affinity with the sphere; the cone especially offers the advantage, that a small conic zone hardly differs at all from a spheric zone. Hence it is conic developments that afford the best projections of special geographical maps, and even by the help of some modifications for considerable parts of the globe. We shall therefore begin by the explanation of this sort of maps.

In the purely conic projection, a spherical zone is considered as confounding itself with the surface of a truncated cone which is tangent to it. If this surface be developed, the parallels become right circles of the summit of the cone, taken for centre; the meridians are right lines which all pass through this same point, and direct themselves towards the base of the cone. In order to fix our ideas better in this respect, let us have recourse to Fig. 30. Let PC be the radius of the sphere, M a place situated at the latitude EM, and OM the co-tangent of that latitude. The development of the mean parallel has for radius the co-tangent of its latitude, and for amplitude the arc equal to the circumference of which MR is the radius.

From the point O, taken for centre, Fig. 31, and with the radius OM, we describe an indefinite arc NN′, and taking OG for the meridian of the middle of the map, we make the angle NOM equal to half the number of degrees contained in the mean parallel. Let us suppose, for example, that this parallel comprehends 25 degrees on the globe, and that the difference in latitude of the extreme parallels is 30 degrees, the mean parallel will have on the map a number of degrees expressed by $\frac{MR}{OM}$ 25 degrees. Such is the amplitude of this arc, since the numbers of degrees contained in two arcs of the same length are to each other as their radii. Thus the angle MON being equal to $\frac{MR\ 25°}{OM.\ 2}$, it is evident that the projections of the meridians will make between them angles less than on the globe, since MO is always greater than MR. Consequently, the parallels of the map, both the superior and inferior to the mean parallel, will exceed those of the globe of which they are the projections; and the more the map is extended in the direction of the latitudes, the more the two extremities will present an inexact proportion. To mark in the projection these extreme parallels, two parts M *a* and M *b*, equal to half the difference of latitude of the extreme parallels, are taken on the axis of the map OG; for example, at 15 degrees in the proposed case. These parallels are then represented by the arcs DD′ and EE′; and to conclude, the middle meridian and the mean parallel are divided into equal parts, which give the graduation of the map.

The faults of this projection are the not preserving equality between the spaces, and only giving true distances in the direction of the meridians. To remedy this, two means have been tried; one consists in taking, instead of the tangent cone, a cone inscribed in totality or in part; the other is to alter the rectilinear projection of the meridians.

If, in place of the arc *a b*, Fig. 31. we take the cord which subtends it for the side of the cone to be developed, the radii of the projections of the extreme parallels would be AO and BO, and the respective position of the points placed on the map would be true on these parallels; but those which would be between the parallels would by no means preserve their true positions. This method is good therefore only for a zone of little breadth.

The astronomer De l'Isle de la Croyere, who was employed to construct a general map of the empire of Russia, which, traced stereographically, would present shocking deformities, made choice of the conical projection; but, to improve it, he made the cone enter into the sphere, so that it cut it according to two parallels placed each at an equal distance from the mean parallel, and from one of the two extreme parallels. The map, by this means, had, on the two parallels just mentioned, the same dimension as the corresponding part of the globe; and its total extent differed but little from that of the country it was to represent, because the excess, which was at the two extremities of the map, was at least compensated in part by the deficiency which the inscribed portion of the cone had with respect to the spherical zone. The map comprising from the 40th degree of latitude to the 70th, the mean parallel answered to 55°, the parallels common with the sphere were those of 47° 30′, and 62° 30′. This projection presents many advantages for general maps of considerable extent, and the principal object of which is to show the totality of a vast empire.[a]

The celebrated Euler made profound researches on this method of projection; he substituted for the determination of the parallels which should be common with the sphere, that of the point of concourse of the right lines which represent the meridians, and of the angle which they make with each other when they comprehend a degree of longitude. His calculations rest on the following conditions: 1*st*, That the errors should be equal at the south and north extremities of the map. 2*d*, That they should also be equal to the greatest of those that take place towards the mean parallel of the map. He hence concludes that the point of concourse of the meridians should be placed beyond the pole by a quantity equal to 5° of latitude, and that the angle of two consecutive meridians should

[a] Mayer, Introd. à la Construction des Cartes, § 31, 32.

be 48′ 44″. He then investigates by how much the arcs of the great circles which measure the distances on the globe, differ from the right lines substituted for them on the map; and he finds that an arc of 90° would have on the map a length of 90° 79′, exact by less than near a hundredth.[a]

Murdoch, an English geometer, proposed three different methods for rendering the conical projection more conformable to the conditions of a good map.[b] This philosopher having explained himself in a laconic manner, his projections have been less appreciated by their real merit than they have been extolled or blamed without proof. We are indebted for a critical explanation of them to the researches of two German geometers.[c] We should deviate from our general method of not entering into abstract mathematical discussion, if we gave a complete idea of all the rules of these projections. The first presents two parallels perfectly similar to those of the sphere, and a conical surface equal in its totality to the spherical surface, but it narrows the distances towards the middle, and enlarges them at the extremities; the spaces even are not equal in dividing the map by two or several zones.[d] This projection offers, nevertheless, a representation sensibly faithful, when the application is made only to zones of 8 or 10 degrees of latitude. The object of the second projection of Murdoch is to obtain the exactness of the perspective, by placing the eye in the centre of the globe as in the central projection; but, for this condition to be fulfilled, it is necessary that the map should be folded in a conical form, like the celestial *coniglobia*, published in Germany by Funk. This latter projection is susceptible of an increasing scale, like the hydrographic maps of Mercator, of which we shall speak hereafter. The third projection of Murdoch seems to offer nothing advantageous.

However ingenious the modifications may be by which it has been attempted to perfect the conical projection, it is evident that they all tend to make it lose its primitive simplicity and facility without obtaining completely the advantages proposed. In the projections after Murdoch and Euler, there is always some part of the map where the spaces are a little too large or a little too small; the errors in the distances, in Murdoch's first projection, may go to $\frac{2}{11}$. It is true that this projection, corrected by Albers, offers such proportions, that in the smallest square, circumscribed by two parallels and two meridians, the defects of more or less destroy each other, so that the spaces are every where in the just proportion; nevertheless the distances taken in the direction of the four cardinal points, are not found exactly, and the configuration of the countries is altered in those same directions.

Geographers have therefore sought, for their special maps, more commodious projections, and which only refer very indirectly to the development of any regular figure whatever.

"It is sufficient," says an illustrious geometer, "for the mathematical exactness of a map that the parallels and meridians be traced after any constant geometrical law whatever."[e] One may imagine therefore a great number of projections, among which it will suffice to notice a few.

The first method proposed by Ptolemy for drawing the world, as known in his time, is an alteration of the conical projection, nearly the same as the method of Delille.[f] He places the eye in the plane of any meridian whatever of the hemisphere containing the known world, and on the prolongation of the radius of the sphere

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[a] Euler, Acta Acad. Petropol. i. p. 1.

[b] Philos. Trans. vol. L. Part ii. p. 554, *et seq.*

[c] Mayer, Introd. p. 298—311. Albers in Zach. Correspond. Astron. xi. 98—114, 240—250.

[d] "In Fig. 32, let C be the centre of the earth, Q a point of the equator, P one of the poles, QMP a meridian, A and B the points of intersection of two parallels. Let us suppose that $QA = \alpha = 70°$ of lat. (ancient measure) and $QB = \beta = 10°$. $QM = \mu = \frac{1}{2}(\alpha+\beta)$ will be $= 40°$. Now the zone of the sphere, limited by A and B, must be represented on a conical surface equal in extent to the spherical zone, and so that the breadth of the spherical zone be equal to the arc BA. In other terms, the quadrilateral NO, *o n* is required, which, turning round the axis *o n*, will describe a conical surface equal to the spherical surface described by the revolution of the segment BA, *a b*, so that NO in the cone remains equal to the arc BA."

"We see that the line NO cuts the arc AB in the two points ζ and η, which are determined by the angles ζCM, and ηCM, the sum of which is equal each to δ. If we take the radius of the sphere $= 57{,}29577$ degrees $= \rho$, we shall find $\cos \delta = \frac{\sin \frac{1}{2}(\alpha-\beta)}{\frac{1}{2}(\alpha-\beta)}$.

"We thence conclude $Kp = R$, the semi-diameter of the projection in degrees of latitude $R = Kp = \rho$. co-tang. μ, cos. δ; or, if we suppose $\rho . 15 = r$, in geographical miles $R = r$. cot. μ, cos. δ."

"In the example given, we shall have $\delta = 17° 16'$, consequently $\eta = \mu + \delta = 40° + 17° 16' = 57° 16'$, and $\zeta = \mu - \delta = 40° - 17° 16' = 22° 44'$, finally $R = 978{,}1$ geographical miles."

"As besides $KO = MA = 30° = 30.15 = 450$ geographical miles, and $KN = MB = 30° = 30.15 = 450$ g. m. we know the two extreme circles of the conical zone by their semi-diameters, namely: $pO = R - KO = 978{,}1 - 450 = 528{,}1$ geogr. miles, and $pN = R + KN = 978{,}1 + 450 = 1428{,}1$ geog. miles."

"Fig. 33 represents a projection conformable to these data, and comprehending 110 degrees; but as yet we only know the semi-diameters for the latitudes of $10° = pN$, of $40° = R$, and of $70° = pO$. It is evident that the two triangles pkK, and CFM are alike, since the angles k and F are both $= 90°$, and the angle $p = MCF = 90° - MCp$. From this is easily drawn the proportion CM : MF = pK : Kk and as CM = to the total sinus $= 1$ and MF $= sin.\ \mu$, we shall substitute for pK any geographical longitude whatever, for which we choose to calculate the angle SpW $= \lambda$, and to Kk, the angle required SpW, we shall have the proportion 1 : $sin.\ \mu = \lambda$: SpW, that is to say: SpW $= \lambda\ sin.\ \mu$.

"In our map, which should comprehend 110 degrees of longitude, the angle S p W will be $= 110.\ sin.\ \mu$. Therefore,

Log. λ = log. 110 = 2,0413927
+ Log. sin. μ. = log. sin. 40° = 9,8080675 — 10
Log. S p W 1,8494602 = log. 70,7066

and, consequently, the angle S p W = 70° 42′, since there is no inconvenience in neglecting the 0,0066 which make 24″.

"Now, the angle S p W on the arch SW is divided into 11 equal parts, and by that are determined the meridians of the map from 10° to 10°" (Albers, loc. cit.)

This author afterwards shows how, taking a principal meridian *s t*, one may calculate the points of intersection of all the meridians with the extreme parallels.

He afterwards gives, for the determination of the remaining parallels, the following method, conformable to the conditions which Murdoch prescribed; "K η is = Kζ. In the triangle CK η, which is rectangular in K, the side K $\eta = r$ sin. KC $\eta = r$ sin. δ; and in like manner in the triangle CK ζ, the side K $\zeta = r$ sin. δ. For our map we shall have

Log. r = log. (57,29 . . . × 15) = log. 859,4366 = 2,9342139
+ Log. sin. δ = log. sin. 17° 16′ = 9,4724922 — 10
Log. K η = log. K ζ = 2,4007061 = log. 255,1

Therefore K η = Kζ = 255,1 geogr. miles, whence we easily conclude $p\eta = p$K — Kη and $p\zeta = p$K + Kζ."

But Murdoch is satisfied with tracing the parallels by dividing TS or VW, Fig. 33, into equal parts; an irregular process, contrary to the conditions of the problem, and which nevertheless diminishes the faults of the map. M. Albers discovered a geometrical law for tracing parallels so as to render the spaces more conformable to those of the sphere. See the complete memoir of Albers in Vol. xii. of the Annals of Voyages and of Geography.

[e] Lagrange, Mem. sur la Construction des Cartes, sect. 2.

[f] Ptol. Geogr. i. cap. 21.

which cuts that meridian at 45° lat. N. He afterwards makes "the globe turn so that the meridians present themselves successively to the eye as right lines uniting at the pole, and the parallels show themselves as arcs of a circle having their convex part towards the south." These words prove that there is no question whatever of a stereographic perspective; the position of the eye is only indicated to demonstrate the possibility of seeing the meridians projected by a right line. The relations of the arcs of the parallels in this projection (Fig. 34.) are determined after an arbitrary scale, the result of which is to render the arc of the meridian PF = 40,000 stadia, exactly proportioned to the arc of the parallel of lat. of Rhodes HKL = 72,000 stadia. The parallel of lat. of Thule OPQ and the equator RST, have also between them the same proportion as on the globe; but they are too great compared to HKL. As Ptolemy extended the known world to $16\frac{1}{2}$ degrees south of the equator, he traces at this latitude the *antiparallel* of Meroe, a place situated at $16\frac{1}{2}°$ to the north of the equator; he divides this arc like that which passes through Meroe, and marks the meridians by drawing right lines between these points of division and those of the equator. This projection is, as we see, only a rude alteration of the conical projection; and even Ptolemy prefers another method, of which we shall give a rapid sketch.[a]

The eye is placed in the plane of the meridian which divides the known world through the middle, and on the prolongation of the radius of the sphere, drawn through the common intersection of this meridian with the parallel of Syene, considered to be the mean parallel of the known world. Consequently, let ABCD, Fig. 35. be the great circle which circumscribes the hemisphere, containing the world known by Ptolemy; let A and C be the poles, BFD the equator, AFC the mean meridian of the known world, and E its point of intersection with the parallel of Syene; then a line drawn from the centre T, through the point E to S, will be the line in which the eye is. If now a great circle, of which BED is the half, is drawn through the point E, the eye will also be in its plane, because it is in its common intersection with the plane of the meridian AEC. Hence, Ptolemy concludes, that the semicircles BED, and AFC, will present themselves as right lines, which cut each other at right angles; that on the contrary, the equator and all its parallels, seeing that their planes have the same inclination to the plane of the great circle BED, in which is the eye, will appear as arcs of parallel circles, having their convex part to the south: finally, that the meridian situated on both sides of the mean meridian AEC, will be seen as arcs of a circle, the concavity of which is turned towards the mean meridian, and which become more and more concave as they remove from it." But instead of developing these principles conformably with perspective, Ptolemy determines the lines of his projection according to arbitrary proportions, combined so as to preserve as much as possible the configuration of the countries.

"Trace," says he, "the rectangular parallelogram ABCD, Fig. 36, so that the side AB be double the side BD. Cut it in two equally by the perpendicular EF, which you will divide into 90 parts. Prolong this line by $91\frac{5}{4}$ parts, to have the centre L. Take FG of $16\frac{5}{12}$ parts to trace with the opening LF the parallel of Meroe SX. Make GH of $23\frac{5}{12}$ to have with the radius LH, the tropic of Cancer TY. Take GK of 63 parts, and from KL, describe the parallel of Thule QR. Bring on these three parts of circumferences TY, QR, SX, the degrees suitable to the parallels which answer to them, and in the relations which they have with those of the equator; and through the corresponding points QTS, RXY, &c. make portions of circumferences pass; they will be the meridians required.

This projection is also employed, though with essential modifications, to depict considerable parts of the globe. The best of the methods, which are derived in some sort from that of Ptolemy, is that employed by Flamstead in his celestial atlas, the improvement of which, if I am not mistaken, is owing to Bonne, one of the best French geographers. The principles of this development are to describe all the parallels from the same centre, taken in the axis of the map, and to take afterwards on each parallel the degrees of longitude as they are given by the law of their decrease, that is to say, proportional to the cosine of their latitude, and last of all, to make a curve line, which represents the meridian, pass through the same series of corresponding points of division. Whatever be the position of the centre on the axis of the map, this projection enjoys the property of representing by equal quadrilaterals, each corresponding quadrilateral formed on the surface of the globe by any two meridians and parallels whatever.[b] The quadrilaterals, moreover, have two of their opposite sides equal in length to the corresponding sides on the sphere, though different by their curvature. The first meridian is rectilinear, and cuts all the parallels at right angles; the rest are curves which cut them more or less obliquely as they remove from the principal meridian; wherefore the quadrilaterals they comprehend lengthen in th direction of one of their diagonals, and contract in the direction of the other. This is the principal defect of this development; but it only becomes sensible at a considerable distance from the centre of the map.

This defect was very sensible in Flamstead's atlas, because that astronomer, having prolonged indefinitely the axis of his map, traced the parallels by infinite radii, that is to say, that they are in the map, right lines cutting the meridians of the exterior of the map, under very oblique angles; whence results a great alteration in the configuration of countries remote from the centre, as may be judged from Fig. 37.

This inconvenience is obviated by drawing the mean parallel of the map so that it may be cut perpendicularly by all the meridians. For this, it is sufficient to take a right line, equal to the cotangent of the latitude of the parallel which divides nearly equally in the direction of the meridians, the region we propose to represent, and with this right line as a radius, to describe the mean parallel of the map; the other parallels will describe themselves from the same centre with the same radius, augmented or diminished by a quantity equal to the part

[a] Ptol. Geogr. i. cap. 24.

[b] Mollweide, Démonstr. Analyt. de la project. &c. Zach. Corresp. Astron. xii. 144.

of the meridian comprised between the mean parallel and that to be traced. It is unnecessary to say that we should also make the principal meridian of the map agree with that which, in the direction of the parallels, divides the map into two equal portions. It is a principle which must be observed in all the developments of the globe.

The corrected projection of Flamstead being now the most generally adopted, we think it right to make known the processes thereof, according to the method adopted in the *Depot de la Guerre.*[a]

Let us propose to apply these principles to the development of a spherical semi-spindle, the angle of which is 100 degrees, new measure. The development will be the projection of a triangle with three right angles, or of the eighth part of the surface of the sphere. In Fig. 38, let C*a* be the representative radius of the proposed sphere, and *a* O a line perpendicular and equal to C*a*. If from the point *a* we let down on C*o* the perpendicular *ae*, it will be the radius of the parallel at the lat. of 50 deg. (new measure,) taking P for the pole, and Q for a point of the equator. This being done, we may consider *a*O as the side of a cone tangent to the sphere; and then the surface near the circle of contact will coincide sensibly with the spherical surface. But, since, on one hand, we have to develope only the quarter of the circumference of which *ae* is the radius, or which comes to the same, the quarter of the curve surface of the right cone which has O *a* for side, and that, on the other hand, *ae* is the sine of 50 degrees, when the radius *a*C is taken for the total sine, we shall have the logarithm of the sine of 50° = 9,8494850, and the sine of 50° = 0,70,711. Then $\frac{1}{4}$ of the circumference which has for radius *ae*, is = 1,1101627; finally, since the arc *a* M *b*, (Fig. 39.) described with a radius *a*O = 1, should have for length 1,1101627, we shall find the number of degrees of this arc by the following proportion:

$$3{,}14 : 200^\circ :: 1{,}1101627 : x = 70^\circ, 71.$$

Such is the value of the angle *a* O *b*, or the amplitude of the arc *ab*, Fig. 39. Now, if we wish to have the degrees of longitude from 5 to 5, we must divide the arc *ab* into 20 equal parts, and the middle M of that arc will be on the axis OM of the map. But as it is not possible to determine the position of the other parallels, as well as the length of their respective degrees, without having a scale of equal parts, constructed according to the number of metres contained in the mean radius *a*C of the earth; a radius which, as we know, is = 6,366198 metres, we shall proceed previously to the construction of this scale. For this purpose, we must bring on an indefinite line *m*C′, Fig. 40, $636\frac{6}{10}$ parts, from C′ to *m*, and must take *a*′ C′ equal to the radius *a*C, Fig. 38; then through all the points of division of the line *m*C, are brought parallel to *a*′ *m*, the right lines *xx*′, *yy*′, &c. The line *a*′ C′ being by this means divided into parts proportional to *m*C′, we form on this module the scale of the Fig. 39.

Having thus constructed the scale of the map, we take in it a length of 50 parts, or myriametres, for the value of the degrees of the meridian, taken from 5 to 5, and we carry that length on the axis of the map, ten times above and ten times below the mean parallel *a b*, Fig. 39. We then describe from the point O, as centre, indefinite arcs, passing through all the points of division of the axis OM; we shall then have the parallels from 5 to 5 degrees. Finally, on each parallel, we take distances equal each to five times the value of the degree of longitude, known by the geographical tables. Thus, on the parallel of 55 degrees, the length of the degree of longitude is 6 myriametres 49; consequently, we must, setting out from the axis of the map, and on both sides of that axis, carry ten times the interval 6,49 × 5 = 32 myriametres 45, taken on the scale. When all the points through which the meridians must pass have been determined in this manner, it is easy to trace those curves.

It must be confessed, that the amplitude of the arc of any parallel whatever, determined by this method, will be a little greater than it ought to be, since we give to the cord of an arc of 5 degrees, the length itself of that arc; but the error which results from it is the less, according as the curvature of the parallel is smaller. Moreover, to obtain a rigorous exactness, we may determine the amplitude of all the parallels like that of the mean parallel, by the angle which the two radii brought to the extremities of that parallel form.

Instead of taking arbitrarily, as in the above example, the radius of the sphere, the length is most commonly fixed by means of a scale constructed beforehand, the parts of which also are in a determined relation with the metre. For example, in the *Depot de la Guerre*, the scale for the drawing and engraving of the map of each of the four parts of the world is $\frac{1}{2000000}$, that is to say, that 2,000,000 metres taken on the ground, will be represented on the map by the real length of a metre. According to this, the radius of the earth, which is 6,366198 metres, will be only on the map $\frac{6\,m,\,366198}{2}$ = 3^m, 18. Hence, that the scale of this map may be divided from 10 to 10 myriametres, or from 100000 to 100000 metres, it is necessary that 10 myriametres have 5 centimetres of length. The *Depot de la Guerre* observes, in like manner, in its special maps, a decimal progression of the scale, so that the degree of latitude of a general map being taken for unity, that of the chorographic map should be represented by one of the numbers 2, 5, or 10, which are exact divisors in the decimal system. By this means, the particular maps are perfectly connected with the general maps, seeing that the proportions of details increase from one to the other map, in relations of easy calculation. But the execution of these maps, by requiring the largest size paper, increase their price too much.

The various modifications of the conical projection having been sufficiently explained, we shall now consider the *cylindrical developments* of the surface of the globe, and the marine charts deduced from them.[b]

The *points of the compass* which navigators follow, hav-

[a] Puissant, Traité de Topog. p. 138.

[b] Neptune Français, Disc. prelim. Bezout, Cours de Mathém. Marine. Dubourguet, Traité de Navig. &c.

Fig. 42.
Page 47.

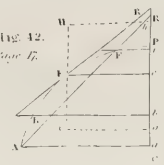
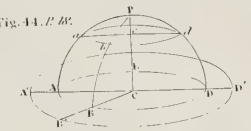


Fig. 44. P. 48.



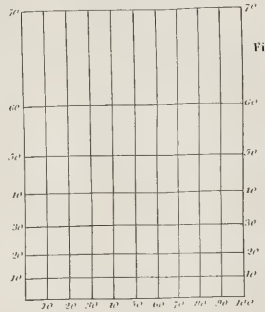


Fig. 45. P. 47.

Fig. 41. P. 47.

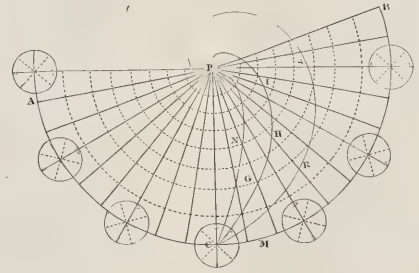


Fig. 15. P. 48.

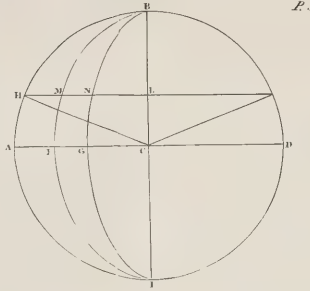
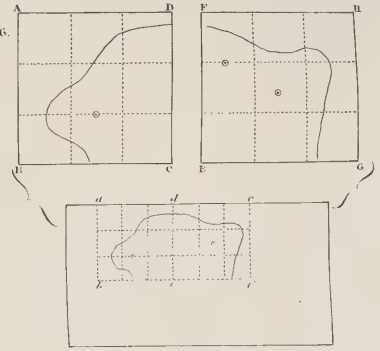


Fig. 16.
P. 51.



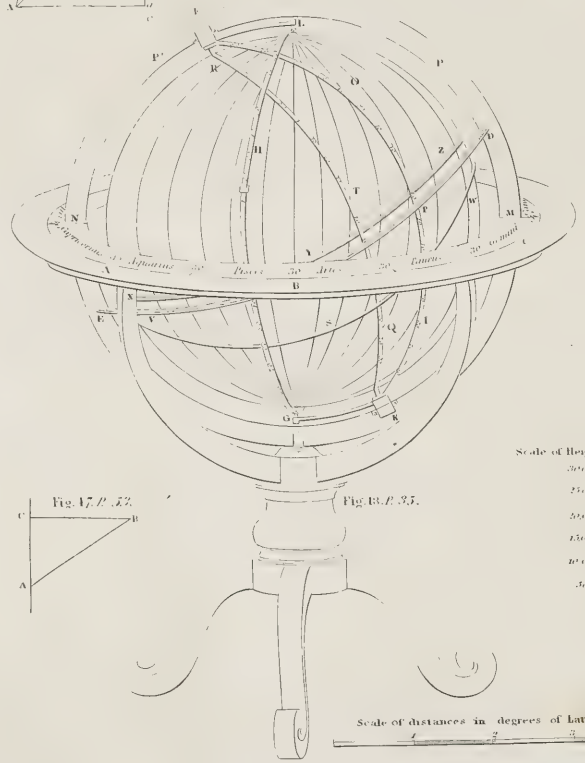
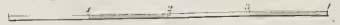


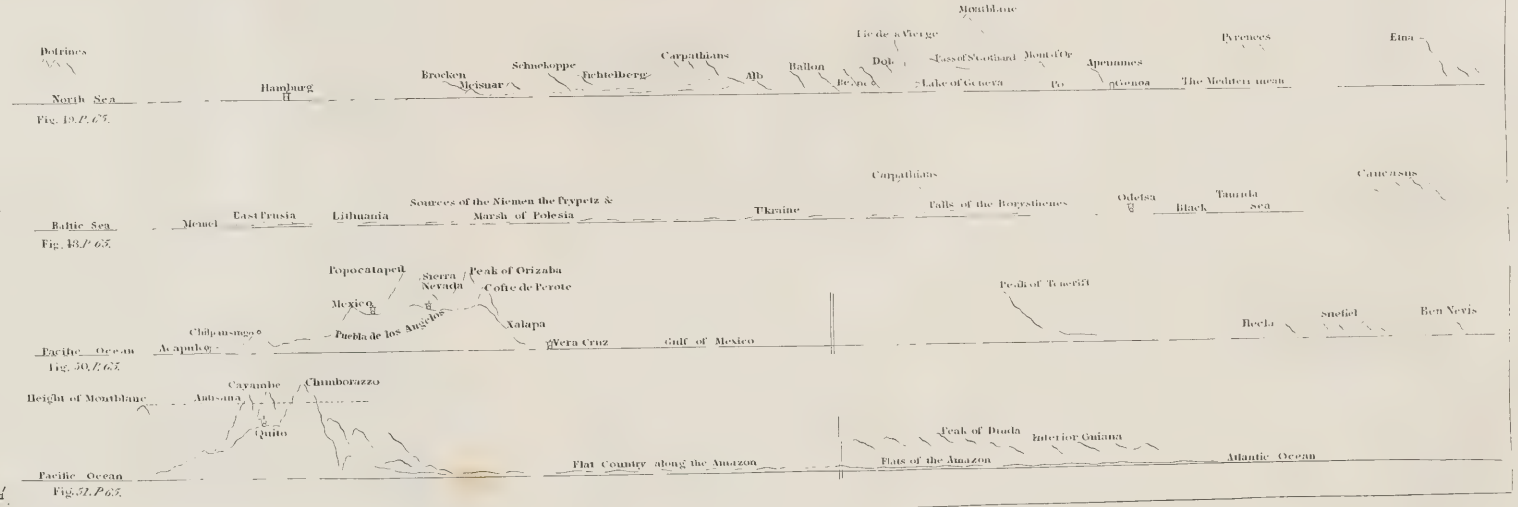
Fig. 47. P. 57.

Fig. 13. P. 35.

Scale of Heights in Feet

Scale of distances in degrees of Latitude





ing the property of cutting under the same angle all the meridians which they traverse, and which, for that reason, form on the globe the spiral named *loxodromic*, are necessarily projected by curve lines, of the same kind in all maps where the meridians are not parallel. This is demonstrated by Fig. 41, in which we see a half of a hemisphere projected on the plane of the equator. Let P be the north pole, AMB the equator; the right lines drawn from the centre to the circumference are meridians, and the concentric circles represent the parallels. Supposing the navigator wishes to go from C, a point of the equator, right north-west, the course of his vessel must constantly make with the meridian of the place, or with the line north and south, an angle of 45 deg. (anc. meas.) Supposing him to be arrived at G, the meridian line GNP, preserves no longer its parallelism with the meridian CP; if he continues his route north-west, keeping always the angle of 45°, he will reach the point H, then the point J, and will thus describe the loxodromic curve CG H J, which constantly approaches the pole, without, however, ever reaching it. The greater the constant angle under which the route cuts the meridians, the longer the loxodromic curve becomes, as is seen in Fig. 41. by the line CRS. It is plain that mariners, who must direct their courses on these lines, cannot conveniently trace on these maps, neither the route they have made, nor that they have still to run, on account of the difficulty of measuring with the compass the arc of a curve. To obviate this inconvenience, they have endeavoured to contrive a projection of maps, in which the meridians should be parallel right lines.

The development of a cylinder immediately presents itself to the mind, as the means of obtaining such a projection. When we merely wish to trace a zone of very little extent in latitude, it is evident that the spherical zone may, without any sensible error, be represented by the development of a cylinder, either inscribed, or circumscribed on that zone, and the axis of which coincides with that of the globe. The meridians which will result from the sections of the cylinder, by planes passing through its axis, are represented by right lines parallel to that axis; the planes of the parallels cut the cylinder according to circles parallel to its base, and which become right lines in the development. Such is the construction of flat maps, the invention of which is falsely attributed to Don Henry, Infante of Portugal, since Marinus of Tyre, anterior to Ptolemy, condemns their use, and has attempted to modify them.[a] Their defects are analogous to those of the conic projection; they are even more considerable; for, in the latter, one may give two parallels their true length with respect to the degrees of latitude, while on the flat map this proportion can be observed with respect to one only; namely, for the inferior, in the development of the circumscribed cylinder, and for the superior in the development of that which is inscribed. It is true that one may avoid this inconvenience, by employing a cylinder constructed on one of the intermediate parallels, which would be partly interior, and partly exterior to the sphere; in this manner, the extent in longitude would be exact towards the middle, but the error would be divided between the two extremities. Cylindrical projections have even been attempted, in which the basis of the cylinder would be any vertical circle whatever;[b] but we shall not mention them, and shall merely observe, that the parallel which serves as base to the cylinder, may be placed so as that the area of the development shall be equal to that of the spherical zone.

The tracing of flat maps is effected without difficulty, as soon as the position of the terrestrial parallel to be developed is fixed; it only remains to give to the degrees of longitude on this parallel, the size they ought to have with respect to that which is assigned to the degree of latitude.

The line HG, Fig. 42. being supposed parallel to the axis CP, and equal to the development of the arc BF, will be the meridian of the map destined to represent the zone comprehended between the parallels of the points B and F. The development of the mean parallel, the radius of which is E *e*, will give the degrees of longitude. This figure shows the defect of the map on the extreme parallels, since the radius G *g* is smaller than B *b*, and the radius H *h* larger than F *f*.

These maps can only serve for very small parts of the globe; the least defective are those which represent the regions near the equator, because at a little distance from this circle the cosines of the latitude do not vary much. D'Anville made use of them in such a case,[c] but it was almost unique.

Nonnius remarked, towards the middle of the 16th century, the defects of flat maps. Mercator, who had just introduced the stereographic projection for maps of the world, considered that mariners do not employ maps to know the figure of countries, but only to trace exactly, according to its length and direction, the course they have made, and to determine the distance they are from different points of the coasts, with the course they must hold to reach or avoid them; he invented, according to this principle, in 1550, the projection of *reduced maps*, which perfectly satisfies these conditions, and of which Wright, Gregory, Halley, and others, discovered the mathematical theory long after.[d] The meridians are here parallel right lines, equidistant and cut at right angles by the parallels to the equator; but the intervals which separate the latter, increase as we advance towards the poles, in an inverse relation to that which the diminution of the degrees of longitude, (Fig. 43.) follows on the globe. Hence it results that the distances in longitude, measured on each parallel, have, with respect to the distances in correspondent latitudes, the same relation as on the globe.

The tracing of these maps has no difficulty but the construction of the scale of latitudes, for which tables have been long since calculated with much care, and even with an allowance for the flattening of the earth. They bear the name of tables of *increasing latitudes*, on account of the augmentation which the length of each degree of latitude has in these tables in proportion as it approaches the pole. As the principles according to which these tables are constructed cannot be rigorously

[a] Marin. Tyr. Ap. Ptolem. i. 20. Comp. Gosselin, Recherches sur la Geogr. des Grecs, ii. 33. *sqq.* i. 46—50, &c. &c.

[b] Textor, in Zach, Corresp. xviii. 190.

[c] Carte de Guinée, 1776. D'Anville, Consid. sur la Géogr. p. 30.

[d] Mollweide, in Zach, Corresp. xiv. 490.

explained without the aid of the integral calculus, we shall confine ourselves to an observation on the nature of reduced maps, and shall indicate hereafter a very simple method to arrive at the construction of these tables by approximative means.[a] It is evident that we must not look in them either for the relative extent of countries, or for the exact image of their configuration; for this projection augments considerably the regions placed towards the poles, though in other respects it shares with the stereographic *projection* the property of preserving their similitude to infinitely small portions of the globe; but these defects have no inconveniences in maps, which should only be considered as instruments destined to resolve geographically the principal questions in navigation, which they do with the greatest exactness and facility, by means of geometrical formulæ given in treatises of navigation.

It still remains for us to point out various methods of tracing maps, which have not the development of a figure for their basis, but only calculations of proportion.

The most remarkable projection of this kind is that invented by the celebrated geometer Lambert,[b] and since examined by an Italian author.[c] The principal condition of this projection is to represent, by equal spaces, regions of equal extent. To construct the map of a hemisphere it is conceived to be divided into semi-spindles, by planes brought through its axis; and on the centre of the great circle perpendicular to this axis, another is described, the area of which may be equivalent to that of the hemisphere. It is easy to see that each semi-spindle will be represented on the circle in question by a sector, the angle of which will be equal to that formed by the two planes which comprehend the spindle. This is shown in Fig. 44. in which P represents the pole, ABD the plane of the equator, APB a semi-spindle comprised between two meridians and the equator; the circle A′ B′ D′ is that the area of which is equal to that of the hemisphere PABDE. We discover also without difficulty that the radius A′ C must in general be equal to the cord AP of the arc of the meridian comprised between the pole and the plane which terminates the spherical dome to be represented.

In the polar projection, traced according to this principle, the meridians are the radii of the circle which terminates the map; the parallels are concentric circles to the former, described from a radius equal to the cord of the complement of the latitude; the quadrilaterals formed by the meridians, and the parallels which terminate a zone, are equal and rectangular as on the sphere; and for this reason the configuration of the countries is not very much altered. The distances are not measured immediately by the right line which joins the two points compared, but it does not differ much from them, and its exact value may be pretty easily taken from them. This projection is also very easy to describe when it is employed to represent hemispheres terminated by the equator; but it becomes more complicated when the hemispheres are terminated by the horizon, because we must there substitute for the meridians and parallels the *azimuth* circles and the *almicantarats* (or parallels to the horizon) of the place taken for the centre of the map, circles to which the longitudes and latitudes can be referred only by a construction or particular calculation.

The inconveniences seem less in the projection of the hemispheres terminated by the meridian. A German geometer[d] has given an analysis of them, from which the following graphic process has been deduced. Trace a circle with the radius AC, Fig. 45; cut it by the lines AD and BE, one representing the equator, the other the meridian of the middle of the map. Mark the cords representing the parallels by dividing the semi-diameters BC and EC, each according to the following scale, the radius AC being taken for unity.

Latitude 10°	— 0,13681	Latitude 60°	— 0,76239
20	— 0,27201	70	— 0,86191
30	— 0,40397	80	— 0,94539
40	— 0,53094	90	— 1,00000
50	— 0,65116		

Finally, divide both the equator and parallels into equal parts, and carry through the corresponding points of division, ellipses representing the meridians. This projection has some resemblance with the orthographic, but is more easy to trace; it disfigures the countries infinitely less, and gives the spaces in their just proportions.

We may consider as an arbitrary alteration of this proportional projection, the method of which the idea is attributed by Vaugondy to G. De L'Isle,[e] but which is indicated in more ancient authors.[f] It consists in dividing the principal meridian, the equator, and the circumference of the map into equal parts, and then carrying through the points of division, curves representing the meridians and parallels. Arrowsmith's maps of the world are traced according to this method, which has nothing particularly recommendable.

The operations of Cassini, to determine the figure of the earth by the measure of the degrees of the meridian, and the parallels, gave rise to a very important kind of projection, being that according to which the great map of France, the finest geographical work ever executed, is constructed.[g]

When it was attempted to measure a degree of longitude, the difficulty was experienced of tracing exactly on the earth a parallel to the equator. In fact, if, by a line directed by means of vertical rods, and perpendicular to the meridian of a place, we determine a series of points, it is evident that, supposing the earth spherical, they will belong to the great circle determined by the vertical plane, drawn perpendicularly to the meridian in question, and which, on the earth, answers to the celestial circle, named *first vertical*. The parallel soon separates from this circle, which it only touches at the point where it cuts the meridian. In a spheroid, the curve perpendicular to the meridian has a double curvature, and an inquiry into its properties has occupied several geometers.[h]

[a] See Note, p. 53.
[b] Lambert, Mem. sur l'usage des Mathem. vol. iii. Observ. sur les Cartes, sect. 99. Mayer, Introd. &c. sect. 52. en All.
[c] De Lorgna, Principi di Geogr. &c. Verona, 1789.
[d] Mollweide, in Zach, Corresp. xii. 160. See Annales les Voyages, vol. xiii.
[e] R. Vaugondy, Instit. Geogr. 324. Puissant, Topogr. 133.
[f] Fournier, Hydrogr. l. xiv. ch. 30.
[g] Cassini, Acad. des Sciences, 1745.
[h] Mém. de l'Acad. des Sciences, 1733.

The meridian and its perpendiculars being the lines most easily traced by astronomical and geodesical operations, it is to the meridian of the observatory at Paris and to its perpendiculars that the points of the map of France are immediately referred; their latitudes and longitudes were only concluded *à posteriori*, and by calculation.[a]

To form an idea of the manner in which this projection represents the terrestrial spaces, we must observe, that the great circles perpendicular to the meridian, (supposing the earth spherical,) all cut each other at the poles of this meridian, and consequently converge towards each other, while, on the map, where the same meridian is a right line, they become parallel to each other. It thence results that the portions determined by two circles perpendicular to the meridian are represented by rectangles of the same length, but broader towards the extremities. Thus their distances and their areas can be measured immediately on the map of France only by approximation; and though the extent in longitude is not considerable enough for the convergence of the perpendiculars to the meridian to induce an important error,[b] we must be cautious in the employment of this projection, which is only excellent for the immediate assemblage of trigonometrical surveys. Several German geometers have calculated formulas and tables to render its use more sure, and correct its errors.[c]

It is to arbitrary developments of the globe that we must refer the construction of the *spindles*, which are traced on paper, to cover globes that are not very large. The surface of the globe is divided into 12 or 18 parts, according to the size of its diameter, by drawing meridians, of 30 to 30°, or of 20 to 20°. The space comprehended between two of these meridians, having very little curve in the direction of its breadth, may be considered as forming part of a cylindrical surface circumscribed about the sphere, on the meridian which divides it into two equal parts. This meridian is developed, and by carrying perpendicularly (like ordinates) on each side the semi-breadths of the portions of parallels comprehended between the meridians which terminate the spindle, we obtain the form of the latter. Sometimes it is truncated at the two extremities at 15 or 20 degrees from the poles, and these two zones or spherical domes are traced apart, considering them as if they were flat. This process is only an approximative mechanism, which facilitates the fabrication of globes, and deserves no farther notice. Let us only express our wish that some able mechanician would invent the means of giving more exactness to the engraving of globes, at the same time that the advantage of the multiplication of copies is preserved.

[a] Du Sejour, Traité Analytique des Mouvemens apparens des Corps celestes, t. ii., and the Description Geometrique de la France, by Cassini.

[b] They extend in the extremities of Cassini's France to 150 toises in 40,000. Barbié du Bocage. Topog. Mem du Depot de la Guerre, 1, 23

[c] Zach, Correspond.

BOOK VI.

Continuation of the Theory of Geography. Continuation and end of the Theory of Geographical Maps. Of the choice and assemblage of Details.

In vain would geometry have taught us so many and such ingenious methods of tracing maps in a manner conformable to the wants of geography, if we could only insert in these pictures of the globe incomplete images of the different countries. All our projections would then be only what the rules of perspective are to a sign-painter. It is the novelty, the exactness, and richness of details, which distinguish a learned map from those unformed sketches, the contrivance of which is confided to ignorance. To compose a good map, we must know how to choose, and to assemble the details which will form its merit.

The first object of consideration for the designing geographer is to determine the kind and the object of his map. Is it *general?* does it embrace a vast portion of the world? He chooses a large paper, and employs a projection such as the different modified conical projections, which hardly alters the configurations. Does he wish to construct a *map of the world*, destined for the studies of astronomical geography? He uses the horizontal stereographic projection. Is it to be applied to physical geography? He prefers the development of it on a single meridian, placing the new continent to the right, not to interrupt the connexion of the continents. In *special* maps, where an empire or province is traced, the choice of the projection seems more indifferent, because the defects of all the methods diminish when the map embraces only a small portion of the surface of the globe. Nevertheless there are advantages and inconveniences which flow from the nature of projections, and which we have indicated in the preceding book; there may be also one projection which, with respect to the paper, will oblige the geographer to admit into his map more countries foreign to his principal object than another; but it is essential to avoid such projections, because they diminish the *scale* of the map; that is to say, the proportion between the image and the object represented. Mariners who *point* their route on maps, say, instead of great and small scale, *great* and *small point*, an expression properly applied only to reduced maps.

The impossibility of admitting into a map, even of very great dimensions, all the details relative to topography, necessitates a choice among those details, which, however, it is impossible to subject to general rules. One map is destined to show the political limits of states, and the boundaries of provinces, with their chief towns; another is destined to show the chains of mountains and the branches of rivers; and these two classes still admit of sub-divisions. A *military* map is, in reality, only a perfect and detailed topography; the warrior should find in it every road in which he can advance, either with artillery, or only with his musket; every ford in a river, every defile by which he can turn the position of an enemy; in a word, these maps should exhibit all the localities which can influence his operations; the number of good military maps is therefore very limited. It is in great part to the excellence of those supplied by the *Depot de la Guerre*, that the French armies owe their successes. A learned geometer, deeply skilled in the art of war,[a] had made a list of the French generals, in which he estimated their talents; opposite an illustrious name was often this note, *He is well acquainted with the map.* The importance of geographical studies for the leaders of armies was felt by the ancients, and the Romans knew well, "that localities frequently influence victory more than courage and numbers."[b]

Other branches of government equally require maps, especially consecrated to a particular object. Those of the waters and forests, for example, should always be consulted as a beacon in cultivation; and in this respect the states of Germany have hitherto had advantages over France. What a military map is for the ground, *nautical* maps are for the seas; they even interest the physical geographer, as they represent, though very imperfectly, the irregularities of the bottom of those basins covered with water which occupy so vast a portion of the globe. The rocks, reefs, and sand-banks, scattered through the seas, are sub-marine mountains and hills; and a complete knowledge of them would throw great light on the geography of the terrestrial mountains. Unfortunately nature seems to forbid the hope of our ever completing that part of geography. "Navigators," says a celebrated mariner,[c] "can only answer for the routes they have made, or the soundings they have taken; and it is possible, that, on the finest seas they may have past *close beside* banks or shoals where there were no breakers (that is to say, whose existence was not betrayed by the foam of broken waves.") The maps of rivers present in detail all the branches of a stream, and all the circumstances of its course. They are comprised with nautical maps, under the general appellation of *hydrographic.*

There are also maps of botany, mineralogy, geology, and even of zoology, the object of which is to show the geographical distribution of the productions of nature;[d] there are some which their authors decorate with the name of *historical*, and which are intended to show the migrations of nations, and the changes of sovereignty;[e] finally, there are few objects, the reduction of whose relations of locality has not been attempted in the form of maps. But the composition of these sorts of tables is subject to rules derived from sciences foreign to geography.

All maps are not intended to advance our knowledge

[a] M. Carnot. Comp. Zach. Corresp. Astron. i. 520.
[b] Veget. De Re Milit. iii. c. 26.
[c] La Perouse, Voy. ii. ch. ii. p. 54.
[d] Ritter, Cartes Physiques de l'Europe.
[e] The Historical Atlas, by Kruse, in German, is the best work of this kind.

by the publication of new details, or by greater exactness. Public instruction requires *elementary maps*, the merit of which consists in rendering, in a faithful and complete manner, truths already known, and in which it were to be wished a system of engraving might be adopted, less elegant and less costly than what the refined taste of the public requires. The essential point in an *elementary atlas*, is not to display on a great scale maps full of details, and of minute exactness, but rather to exhibit, in a series of small but numerous maps, the complete assemblage of the principles of the science.

After having duly reflected on his object, the designer has to collect and combine the details necessary to fill his map.

Good astronomical observations here hold, without dispute, the first rank; but how difficult is it to judge whether an observation be good! How many inconsiderate changes have been introduced into geography by the employment of longitudes badly observed or ill calculated! Above all, how many errors are owing to the careless use of the chronometer! We have indicated the different methods by which the astronomer assists in fixing the geographical positions of terrestrial places;[a] but the value of an observation does not depend solely on the goodness of the method; to appreciate it must know all the processes, and all the circumstances, and submit these details to a minute criticism, and to careful calculations. In a word, we must imitate the example of Oltmanns, in his Researches on the Observations of Humboldt. It is in studying the work of this geometer,[b] that geographers may learn all the rules of sound criticism with respect to astronomical data. The true geographer ought to be almost an astronomer. Thus we everywhere recognise that fraternal tie which unites all the sciences by rendering them necessary to each other!

The second and the richest source from which geographers draw the details of their maps, is triangulation; we have given an idea of it in speaking of the measurement of the earth by Picard.[c]

When the position of a certain number of points has been fixed, either by astronomical observations, or trigonometrical measures, it is easy to connect with these points the particular plans taken on the ground, and which exhibit the localities in detail. But, as the art of drawing plans on the ground depends in great part on principles foreign to geography, we shall content ourselves with indicating merely some practical means employed by geographers for constructing a topographical map from partial surveys. The reader who wishes for detailed instructions on trigonometrical surveys, cannot do better than to have recourse to the excellent Treatise on Geodesy by the learned and ingenious Puissant.

When we wish to construct a map by connecting together plans taken separately, it is necessary that each of these plans should have at least two points in common with that to which it is to be joined; or, which comes to the same, there must be a line determined both in size and position in one which can be applied to a similar line in the other. Then, by drawing on the paper destined to form the general plan that *directing line*, so that there may be on each side a space proper for comprising each of the plans, it will be easy to refer to this general plan all the points that have been determined on the partial plans, by attaching them, by triangles, to any two points taken on the directing line, or combining them with any point, the position of which has been fixed. If there is to be a reduction, as almost always happens, the triangles of the topographical plan must be made similar to those formed on the draughts of the surveys; but so that the sides of the former may be to those of the latter in the relation which the reduction to be made requires.

When the sheets of the surveys are *orientées*, that is to say, when on each sheet the direction of the meridian, either the true or the magnetic, has been marked, the points of each plan are referred to the meridian, and to a perpendicular to that line drawn through a point common to two contiguous plans. The distances are measured from all the points to each of these right lines parallel with the other; and, either preserving these distances as they were found, or reducing them in the relation required, they are brought on the meridian and the perpendicular drawn in the topographical plan, to represent those which are common to the collected plans. This method of constructing graphically the general map after the plans of the surveys, has given rise to a mechanism of reduction known by the name of trellis; it is very convenient for bringing together the details of the map, but should not be used for fixing the position of the principal points. This operation consists in dividing the plans that are to be united into squares, by lines parallel and perpendicular to that which is common to those plans; the more these squares are multiplied, the better we perceive the place occupied in each square by the points and turns contained in it, the more easy also it is to refer them to the corresponding squares traced on the plan of reduction or of assemblage. Fig. 46. represents this operation. The leaves ABCD, EFGH, having for common lines the right lines CD and EF, are divided into squares, the sides of which are parallel and perpendicular to those right lines; the plan of assemblage *a b f e*, is divided in the same manner, with respect to the line *c d*, which represents the common right line, but the sides of each square are the halves of those of the plans ABCD, EFGH, so that the objects marked on these leaves are reduced on the plan of assemblage to a half of their former dimensions, and to a space which is only the quarter of that they first filled. To reproduce the design traced on each of the primitive plans, either it may be imitated at sight, in the corresponding squares of the leaves ABCD, EFGH, or else, for more exactness, marks are made on each of the sides of the latter, and transferred to the others. If we wish to preserve exactly the designs that are to be copied, we may place upon them a very smooth piece of glass, and of equal transparency, on which squares are traced with a diamond, and afterwards two perpendicular lines are made to coincide together on those which are to serve for the assemblage of the collected plans, or on the points which determine them.

After having thus formed the topographical plans by

[a] Above, b. i.
[b] Voyage de Humboldt, part. astron.
[c] Above, b. ii.

the assemblage of the various plans of the surveys, chorographic maps are formed from them, not only by assembling the plans, but by submitting them likewise to the laws of the projection that has been adopted. For this purpose, the meridians and the parallels are traced on those plans in right lines, as those circles are when only a portion infinitely small is considered. The corresponding quadrilaterals are also described on the frame of the map to be constructed, but conformably to the laws of the adopted projection; there is then nothing farther but to design in these quadrilaterals what is contained in the squares comprised between the meridians and the parallels of the topographical plans. If we wish for extreme precision, we take, with respect to the sides of the squares, the distances of the principal points inclosed in them; these distances are converted into subdivisions of the degrees of longitude, and similar ones are taken afterwards, setting out from the parallel and the meridian contiguous to the corresponding quadrilaterals on the map.

Two circumstances may stop the geographer in this operation. It may happen that the topographical plan may not be *orienté*, or having been so by the direction of the magnetic needle only, we do not know what was the declination of the compass at the time when the plan was taken and reduced, nor in the place of observation. This element may be supplied when the plan contains two points, of which the respective position is known, for, by joining these two points by a right line, we have the angle which this right line makes with the meridian, and, consequently, we may fix its place with respect to the meridian, or construct, by means of the given angle, the meridian of the plan. One may recover also, by similar means, the scale of a topographical map which is wanting; for, knowing the distance of two points of this map, we have only to divide the line which joins those two points into parts proportional to the itinerary measures contained in this distance; then it becomes the scale of the map, and shows the respective distances of all the other points.

Chorographic maps are reduced into general maps by a process analogous to that we have just explained; we bring on the quadrilaterals formed by the meridians and the parallels of the general map, what is contained in the corresponding quadrilaterals of the chorographic maps we wish to assemble. But here the necessity of *geographical criticism* appears; here it is that the designer, quitting the humble part of a copyist, should, by his knowledge and researches, and especially by his intelligence, supply the imperfections of topographical data. Sometimes it is errors he has to correct, sometimes deficiencies to fill up; most commonly these two inconveniences are combined together.

It may happen that, in the topographic plans employed in the construction of chorographic maps, there may be errors common to all the points, as distances too small or too great in the same direction, and these errors may have been accumulated on the chorographic maps, and afterwards on the general map; the great spaces which it represents are then either considerably narrowed, or considerably lengthened, without the geographer himself being able to perceive it. In this case, the geographer will connect the details of the general map with the different points, the latitudes and longitudes of which are known by astronomical observations; these points determine on the map spaces into which the intermediary details will necessarily fit; sometimes the excess or defect that is found may be attributed to the imperfection of the mechanical processes employed for the assemblage of the maps; but then there is no other way but to divide the differences among all the points of each partial plan, which will render the errors less sensible.

The geographer unfortunately is but too often deprived of astronomical observations and trigonometrical surveys; there are only a few countries, as France, England, Denmark, Holland, and Hungary, which have been surveyed trigonometrically in their whole extent; there are still some European provinces where no astronomers have been. Geography is obliged therefore to have recourse to *itinerary distances*, always very difficult to estimate in a rigorous way, even when we know exactly the value of the measures in which they have been calculated. This science is as yet very little advanced, either on account of the immense number of measures to be compared, or on account of the variations to which they are subject, or, finally, with respect to many ancient measures, because the authentic modules are wanting.[a]

We have already seen[b] that there are various opinions on the manner of estimating the *stadia* of the ancients, and that it is still doubtful if they should be considered as astronomical modules or local measures. We find in the ancients one passage in three which does not allow us to admit the first supposition, unless by adopting the most violent and innumerable corrections,[c] or by the admission of an improbable mixture of different stadia; in the second hypothesis, which to us appears preferable, we do not yet perceive the basis from which to set out; we are on the right road but surrounded with profound darkness. However, this obscurity is better than the false glimmer of an hypothesis void of proof; and, besides, why should we be surprised at the doubts in which ancient metrology is enveloped, when we know that even modern measures present cases in which it is difficult to reduce them? Undoubtedly we know exactly the relations of the measures most commonly used in capital towns, and cited in the works of the learned: we know, for example, the value of the English mile, and of the nautical mile, the degree of the meridian containing 69 of the former and 60 of the latter; we know also that the English foot, being equal to 0,9384 of the French foot, is 11 inches 3 lines, 1, and that the yard used in England for measuring short distances is three feet English; we consequently conclude that the yard represents 33 inches, 9 lines, 3 of France. Similar reductions give the means of converting into each other the measures generally in use in great states; but there are besides,

[a] Traité des Mesures Itinéraires des Anciens, par d'Anville Observations, &c. par Gosselin, en avant de la traduction Française de Strabon. Traité des Mesures, par Romé de l'Isle. Métrologie constitutionnelle, par Paucton. Traité des Monnaies, des Mesures, &c. par Gérard Kruse, en Allemand. See the Tables at the end of this Volume.

[b] Hist. Geog. p. 90—92.

[c] See the Notes of the French Translation of Strabo.

in the provinces, local measures little known, and with respect to which multiplied researches must be made to obtain their relation with the others, either by comparing their components with the best fixed unities, or by setting out from some distance valued in local measure, and known in geographical measures. In France, for example, nothing formerly varied more, than the length of a league, from one province to another. The perch even, which serves for surveying, was sometimes 22 feet, sometimes only 18. The new metrical system will prevent any such confusion in future.[a]

When we know the value of the measures in which an itinerary is conceived, the direction of the route is marked after the points of the compass. When we have the length and the direction of a route, setting off from a point, the position of which is given, we very easily find that of the point where this route terminates. In the first place, when the route is not considerable, one may, in the space it traverses, neglect the curvature of the earth, that is to say, consider the meridians as parallel with each other, and, consequently, the points of the compass as right lines. To construct this route on a flat map, it is then sufficient to draw, through the *point of departure*, a line which may make with the meridian of this point an angle equal to that which the point of the compass followed gives, and to carry on that line a number of parts of the scale equal to that of the itinerary measures gone over: the point where these parts terminate will be the *point of arrival*. Calculation may also be substituted for construction; if from the extremity of the route gone over we bring down on the meridian, which passes by the other extremity, a perpendicular, a rectangled triangle will result, in which the part of the meridian intercepted between the point of departure and the perpendicular brought from the point of arrival will indicate the distance of these points taken on the line north and south, or the difference of latitude expressed in itinerary measures; which are afterwards reduced, according to their value, into degrees of the meridian. And the perpendicular will express the distance of these same points taken on the line east and west, which is confounded in this case with the difference of longitude expressed in itinerary measures. If we wish to convert it into degrees, we must divide it by the number of those measures which a degree of the parallel of the point of departure ought to contain, or, if we wish for still more exactness, by the number of measures comprised in a degree of the parallel which holds the middle between that of the point of departure and that of the point of arrival. All this operation is nothing but dividing the number of the itinerary measures by the cosine of the latitude of the mean parallel.

A second question may present itself, in the case where the direction of the route is not known; the latitude of the point of arrival is then substituted for it. The construction on the flat map consists, in this case, in drawing through its latitude the parallel of the point of arrival; in taking on the scale of the map the number of measures assigned to the distance gone over, and to describe with this distance as radius, and from the point of departure as centre, a circle which will cut in the point of arrival the parallel previously drawn. If we wish to resolve this question by calculation, we must convert into itinerary measures the difference of latitude between the point of arrival and the point of departure; we have then in the rectangled triangle formed by the meridian of the point of departure, the perpendicular let down from the point of arrival and the route, two known sides, namely, the length of the route, or the hypothenuse, and the part of the meridian comprised between the point of departure, and the perpendicular of the point of arrival: by calculating the length of this perpendicular, we find the distance of the points of departure and of arrival, taken on the line *east* and *west*, whence we conclude, as above, the difference of longitude.

When the route gone over is of a considerable length, it becomes necessary to take the curvature of the earth into account. The construction of the two preceding problems requires, with respect to the reduction of leagues gone over in the direction *east* and *west*, to degrees of longitude, the employment of the tables of increasing latitudes, which contain the results of the trigonometrical calculation, by which the case may be resolved.[b] For the first question in which the direction of the route

[a] Since this was written, M. Uckert, a professor at Gotha, has attempted to prove, in a learned manner, that the ancients only used one kind of *stadium*, that of Olympia, and that all the differences and contradictions in point of measures proceeded from the imperfect means they were obliged to employ.—Ed.

[b] We have seen above, (p. 48.) that it is only by the help of the integral calculus that we can arrive at the exact construction of the tables of increasing latitudes; but geographers commonly make use of a very simple approximative means to reduce the curve to a right line, by considering the route gone over as divided into parts small enough to be regarded as right lines. In fact, since the points of the compass cut all the meridians under the same angle, we may conceive that, through the extremities of all these subdivisions, may be brought meridians and parallels; thus will be formed, on each of these parts, a rectangled triangle, in which the sides of the right angle will be the differences of latitude and longitude, and the part of the route gone over will form the hypothenuse. But rectilinear trigonometry supplies the means of calculating this triangle, since we know the hypothenuse and an angle. Let ABC, Fig. 47. be one of these triangles; we shall have by the principles of rectilinear trigonometry, AB : AC :: 1 : cos. BAC; whence we shall conclude AC = AB cos. BAC. Now, as the angle BAC is the same with respect to all the meridians which traverse its route, each difference of latitude, from one small triangle to the other, will offer the same factor, and the sum of all these differences, which is evidently the total difference in latitude, between the point of departure and the point of arrival, must be *equal to the sum of the portions of the route, that is to say, to the total length of this route, multiplied by the cosine of the angle which its direction forms with the meridian.* We shall be in the same case as when we neglect the curvature of the earth, and the same means must be employed to reduce the route to degrees.

If we now wish to know the difference in longitude corresponding to BC, it is by means of the latitude AC that we can calculate it. We shall have the proportion AC : BC :: 1 : tang. BAC, from which we shall conclude, BC = AC tang. BAC. To know how much this difference makes in aliquot parts of the equator, we shall design by L the latitude of the parallel under which is situated the point A, and we shall have this proportion, BC : x (or to the corresponding part of the equator) :: cos. L : 1, which we can transform into this; $x = \frac{BC}{\cos. L}$, and if we put in the place of BC its value, which we found above, this proportion will result: *the difference in longitude* $= \frac{AC}{\cos. L} \times$ tang. BAC. We shall obtain, therefore, the sum of all these small differences of longitude resulting from each part of the route, if we multiply by the constant factor tang. BAC, the sum of all the values represented successively by the factor $\frac{AC}{\cos. L}$, changing for each portion of route.

Let us now conceive all these portions so small that the difference AC is equivalent to 1′ of a great circle of a globe, and let us observe that $\frac{1'}{\cos. L.} =$ sec. L. we may substitute to that expression this: *the difference in longitude* $= 1' \times$ sec. L. tang. BAC; then we shall find the

is known, after having obtained, as above, the latitude of the point of arrival, we must take, in the table of increasing latitudes, the difference of the numbers which answer to this latitude, and to that of the point of departure; it must be multiplied by the tangent of the angle corresponding to the point of the compass, and the result will be the difference of longitude expressed in minutes of a degree. In the second question, the angle of the point of the compass is not given; but it may be calculated by the difference of latitude reduced into leagues, and by the distance, which are then the data; the difference of longitude is afterwards concluded by the rule just indicated. Supposing, for example, that a vessel set out from a point situated at 42° 3′ of north latitude, has gone 252 marine leagues to the *north-east* $\frac{1}{4}$ *east:* we remark in the first place, that this point of the compass forms with the meridian, on the east side, an angle of 56° 15′, and we thence conclude that the route answers, on the line north and south, to 140 leagues; which gives 7° difference of latitude towards the north. As this difference is of the same denomination as the latitude of the point of departure, it must be added to the latter, to obtain that of the point of arrival, which, consequently, must be 49° 3′. We then look, in a table of increasing latitudes, for the number which answers to 49° 3′, namely, 3386,7; then for that which answers to 42° 3′, and which is 2785,8, and we take the difference = 600,9; to the logarithm of this difference is added that of the tangent of 56° 15′, the angle of the point of the compass, and the result which answers to 899′, or to 14° 59′, is the difference of longitude towards the east.

These rules can only lead to exact results, in so far as they are applied to data exempt from error. But this is not always the case, especially in ancient geography, and even in modern travels down to the 16th century. In the first place, the direction of the route, often ill observed by land, is still more so at sea. If it has been marked according to the rising of the sun, the diversity of the seasons often renders it uncertain; if it be indicated according to the compass, it may be affected by the variation of the needle, which has not been always observed. Navigators were exposed to another cause of error. They did not allow for the angle,[a] which the real route of the vessel forms, with the direction of its keel, whenever the vessel receives the impulsion of the wind sideways; for, in this case, a part of this force tends to push it out of this route, while it is kept in it only by the action of the rudder, and by the great resistance which the surrounding fluid opposes against its sides. This angle, rather difficult to determine, was generally neglected by the navigators of preceding ages. There are also great uncertainties in the measure of the distance gone over. The ancients were in the habit of reckoning it by the number of days of marching or of sailing, and we have seen, in the history of geographical discoveries, how difficult it was to fix the value of those days, which, expressed in different or vague terms, must also vary according to times, seasons, regions, the mode of travelling, and the size and form of vessels. Even the most learned combination of all these circumstances, only procures us mean values the more probable, as a greater number of sure and authentic facts have been combined. Geographers have thought that by studying and estimating the sinuosities of roads, in countries intersected by mountains or by considerable streams of water, and also in plains, we might arrive at general principles on the augmentation of length which these windings occasion, and which of course must be subtracted, if we wish to reckon the distances on the same line. The Arabian geographer, Al-Biruni, concluded that, in the East, itinerary distances should in general be reduced a fifth.[b] D'Anville finds, on the contrary, that in Italy and Egypt, and, in general, in the world known to the Romans, we need only deduct an eighth.[c] The very nature of the question evidently renders a general solution impossible.

We may say the same of the discussions which have attempted to fix the value of days of marching and sailing. When Herodotus[d] fixes a day's sailing, during the day, at 700 stadia, while Scylax[e] only admits 500, it may be right to consider this difference as merely the result of the employment of stadia of a different value; that of Scylax being probably very near the stadia of 883 to a degree, and that of Herodotus, being the Egyptian stadium of 1111 to a degree, ancient measure. But the Greek geographers themselves have expressly informed us, that their days of navigation varied according to the places, times, and means employed.[f]

The combinations that have been made of such maritime distances,[g] should therefore be considered only as approximative, and in no respect superior to the data which result from the physical and historical descriptions of countries that have been visited.

How, indeed, could we expect to fix the value of the ancient days of navigation, when it is notorious that we hardly know that of the navigators nearest our own times? The ordinary means for estimating distances at sea, are still subject to much uncertainty. To estimate the distance gone over by a vessel, requires a knowledge of the effect of currents, which act at once on the vessel and on the *log*, which sailors throw into the sea, and which serves as a fixed point for them, from which they count how much they advance in a given time, commonly half a minute. This motion is measured by means of a cord divided by knots, the interval between which answers to the 120th part of the hour. But when the vessel and the log are subjected to the action of the same current, the distance by which the vessel exceeds the log, only indicates the relative quickness of the ship with respect to the current; and we have still to determine the velocity which this current im-

sum of the factors $1' \times$ sec. L, by adding all the secants from minute to minute, from the latitude of the point of departure to that of the point where the route terminates.

As the arc of 1′ is not rigorously a right line, the process is only approximative; if we wish to render it more exact, by taking the secants from second to second, we should fall into extremely long and fastidious operations. It is to the integral calculation therefore we must have recourse. See the excellent Traité de Navig. of M. Dubourguet, b. i. chap. 3 and 4, &c.

[a] Lee-way.—P.
[b] Al-Biruni, ap. Edw. Bernards, de Ponder. et Mens.
[c] D'Anville, Consider. sur la Geog. 44—47.
[d] Herod. iv. 46.
[e] Scylax Peripl p. 30. ed Voss.
[f] Ptolemée, Geog. i. c. g. Marcian Heracl. p. 67, (tom. i. Geog Minor.)
[g] See the authors cited in the tables of this volume

presses at the same time on the log and on the vessel. Such is the principal origin of the differences, often very considerable, between the place where pilots think they are, according to the estimate of their routes, and that where the vessel really is. In consequence of these errors, the lands discovered by the Magellans, the Mendanas, the Quiroses, have been so ill placed in longitude, that geographers have had great difficulty to ascertain them. We have seen, if we may say so, *Solomon's* isles, so remarkable for their beauty and riches, and for the detailed description of them by their first discoverer Mendana, floating through near a quarter of the circumference of the globe. None of the navigators who went over these parts after him, beginning with Quiros, his companion, and who followed him immediately, could break the charm which seemed to forbid mankind access to a land which the imagination, stimulated by obstacles, clothed in the most brilliant colours. More sober minds began to doubt their existence; when Dalrymple and Fleurieu showed, that they must be identical either with the New-Britain of Dampier, or with the land of the Arsacides, and the adjacent isles visited by Bougainville and Surville. In the latter hypothesis, the latitudes first assigned to them were not very exact; but the currents which go from east to west, in the great ocean, had accelerated very much, without his being able to perceive it, the vessel of Mendana, who reckoned himself to be only 1500 Spanish leagues, or about 1700 marine leagues of France, from the coasts of Peru, when he was really near 2400.

Since the frequent observation of longitudes has permitted a comparison, in many points, of the distance estimated with that really gone over, navigators who have sailed round the world, have collected and multiplied very important data on the velocity of currents in the various seas of the globe.[a]

Astronomical observations, trigonometrical surveys, and itinerary distances, are the three elements of every map entirely *original*. But, commonly, we do not find these three elements completely united, especially for countries remote from Europe; we are therefore reduced to repeat what other geographers have published with respect to the parts on which we have no new information. Here again the geographer requires great sagacity.

When he has established the agreement of the measures, or scales employed in the various maps which he wishes to analyse and discuss, he is enabled to construct a scale for those that have none, provided the latitude and longitude of any point whatever of those maps be known to him, either immediately, or by its distances from given points. He can, consequently, compare, by the positions which they assign to the same places, the maps which represent the same regions; and this manner of proceeding, is at the same time the surest and most commodious, as it facilitates the observation of the differences resulting from projections. If the geographer finds the same point placed under different longitudes and latitudes in several maps, to appreciate these different data, he must examine how these maps present other essential circumstances; it is then that he should compare the respective situations of places with respect to determined astronomical points, and that he ought to scrutinize minutely the configuration of shores, the trace of rivers, of chains of mountains, and of high roads, and the indication of the limits of territory. A similar examination teaches him in what his maps differ, and in what they agree; he is left to choose between them. The latitudes less difficult to observe than the longitudes, are generally better fixed on maps, drawn according to the relations of travellers of rather ancient date. The common defect of maps, anterior to D'Anville, is to augment much the distances of places in the direction *east* and *west*. The farther the points in question are from the principal meridian, according to which the longitudes of the others have been determined, the more considerable these errors become. This strikes the least skilful eye in the maps of Ptolemy, with respect to the differences of longitude which they give between Alexandria and the other towns situated on the borders of the Mediterranean. The absurd opinion which places Serica in China, and other similar errors, are only due to the false extension of Ptolemy's maps in the direction of longitude. But we are indebted to this same fault, repeated in the maps of the middle ages, for the fortunate error in the extension of the islands of Japan [b] to the east, which gave Christopher Columbus courage to cross the Atlantic.

The maps of Sanson, Jaillot, and others, formed at the end of the 17th century, and admired by some bibliomaniacs, likewise dilate all the countries in the direction of the longitudes.[c] Such maps, however, afford useful materials, when the positions are corrected in the direction *east* and *west*, by distributing proportionally to the distance from the principal meridian, the differences between the longitudes which these maps give, and those which result from the new determinations.

Too often the geographer has no decisive reason for choosing between the different positions assigned to the same place by several maps. Surrounded by uncertainties, he has only then to take the middle, according to the rules of arithmetic, between the latitudes on one side, and the longitudes on the other, as they are given by the maps. He then places, on that which he wishes to construct, the principal points, according to a reduction, the process of which it would be superfluous to indicate. Sometimes the geographer is obliged to compare maps of detail by the distances they give between the same places, distances which have been most frequently the elements for the construction of those maps, and which, for this reason, it is often essential to ascertain. He may then choose, on each of those which he wishes to compare, two corresponding points, determined with exactness, and from which he can measure the distances to all the others. All these distances being brought to one single scale, he traces on the paper a line, which represents the distance of the two principal points, according to the scale he employs. On this line, serving for base, he describes, with the distances drawn from each map in particular, triangles, the summit of which answers to the place assigned by each of these maps to the points he examines. Two different

[a] Voyage of Captain Marchand, drawn up by Fleurieu.
[b] Zipangu.—P
[c] D'Anville, Considerations, p. 11, *sqq.*

determinations of the same point being joined by a line, the mean position will be found on the middle of this line. Three determinations give a triangle, and a greater number constitute a polygon. In these cases, the mean position is found by seeking the centre of gravity of the area of this polygon, its angles being considered as masses equal to unity. This is not the place to give the demonstration of this rule, founded on the principles of statics, and on the theory of mean values; we may, however, be allowed to remind the reader that, in the case of a triangle, the centre of gravity is at the intersection of the right lines, drawn from the summits of two angles, to the middle points of the opposite sides. This easy construction only is wanted in the most ordinary case, when there are only three determinations. The mean distances from one point to two others, the position of which is given, being once fixed, it is easy to determine the latitude and longitude of this point, and to place it afterwards, by their means, on the map to be constructed, whatever be its projection. When the combined points embrace a space so little extended that the projection is not sensible, the labour is abridged by transporting to the map, by means of the *trellis*, the results of these comparisons.

The mathematical elements of a map being determined, it still remains to introduce into it the historical, political, and physical details, of which its extent and object render it capable.

The objects of common geography require the employment of only a small number of signs, easily understood, and the sense of which was explained by ancient geographers, in a legend placed on one of the sides of the map; a custom which ought to be resumed in elementary atlasses. These signs indicate the position of places, and are modified according to the importance of these places, and the rank which they occupy in civil, military, or ecclesiastical government. When we wish to measure distances on a map, we must remark the very small circle or cipher, which is either adjacent to, or inscribed in each of those signs, because it is the central point of this circle which fixes the geographical position of the place. When the map descends into a great detail, the principal features of the plan of large towns are expressed, and then care should be taken to mark on this plan, that point to which the geographical position is referred. A simple line shows the course of small streams, and the two banks are indicated separately, only when the dimensions of the bed of the river can be appreciated by the scale of the map; which is most frequently at the mouth, or at places where the stream is dotted with islands. The sea shores are indicated by a very clean line, bordered with hatchings. In geographical maps, these hatchings, exterior with respect to the land, may be conceived to represent the undulations of the sea on the coasts; while, in marine maps, the hatchings done on the land, paint to the eye the acclivity of the coast. Navigable canals are represented by straight lines joined angularly, which distinguishes them sufficiently from natural streams of water, indicated by undulating lines. Roads are often marked by two fine parallel strokes, sometimes by simple lines, continuous, or punctuated; the latter, however, are most commonly reserved for marking the limits of states and their provinces, and for this purpose the size and form of the points are varied.

To render more striking those political divisions, which so often form an absurd contrast with natural limits, the monotony of the engraving is relieved by varied colours. Some German geographers have preserved the ancient French method of spreading the same tint over a whole region, which they wish to distinguish from others. This mode of illuminating, has perhaps less elegance than that used now in France; but it has the advantage of showing better the extent of regions, and the form of their limits: it should be adopted in every elementary atlas.

Some teachers think also, with reason, that the old manner of indicating the towns by little towers, multiplied and modified according to the rank of the place, was preferable in general maps, to the mode prescribed in the *Depot de la Guerre*, which consists in representing every object on a geometrical plan;[a] a system, the rigorous application of which, in our opinion, should be reserved for topographical and chorographical maps.

We cannot pass over in silence a point of which, among the French, D'Anville[b] alone felt the importance; this is the orthographical exactness of the names in maps. Good sense dictates the rule of writing each geographical name, as near as possible to what is used in the country it belongs to, and to what is pointed out by sound etymology. A corrupted orthography should only be admitted when the right one would not be understood by the generality of readers. Thus, it is certainly wrong to write *Natolia*, instead of *Anatolia*, which is required by the Greek etymology, or *Dannemarck*, with the German consonant *ck*, in place of *Danemark*, which is conformable at once both to the genius of the French tongue and to that of the Danish. It is thus that a certain number of geographical denominations might be brought back to the true orthography. However, a much more considerable number would not admit of this reform. It would be easy, for example, to introduce *Ireland* instead of Irlande; but, in France, *Scotland* could never be substituted for Ecosse, as the first name would be unintelligible to most French readers. It is true, that it is rather difficult to practise this rule, with respect to names drawn from languages in which a different alphabet is employed from that adopted in Western Europe. Such is the case with the Russian, Persian, Arabian, Indian names, and others; also with the Polish, in which several letters of the alphabet have a different value from what we give them. This is not the place to examine all the expedients that might be tried to establish, once for all, a geographical orthography, not absolutely fixed, (which would perhaps be useless,) but at least easy to follow and comprehend.[c]

The physical part of a map requires attention to be paid to certain other circumstances. It is desirable to know if a country is covered with plains, or is rough with mountains, naked or wooded, dry or marshy, Designers have introduced signs, either conventional, or of the nature of pictured representations, to express, on trigonometric surveys, and topographical plans, these different

[a] Mém. Topogr. et Milit.
[b] D'Anville, Considé. sur la Geogr. p. 61, *sqq.*

[c] Comp. Langlès, Préface du Voyage de Norden; Volney, sur l'Alphabet Russe, &c.

circumstances, which, joined with the climate and the laws of meteorological phenomena, determine the *physical geography* of each country. It is sufficient to cast one's eyes on the plans of this kind, to discover the signs employed in them; they are all conformable to the rules of bird's-eye perspective; thus the parts more or less strongly shaded, represent slopes more or less steep, on which the light is lost the more they approach the vertical position. Geographical maps are less calculated to admit of this improvement, especially with regard to mountains; for the scale of those maps is necessarily too small to admit of expressing on them, in just proportions, the innumerable inequalities of ground, from the highest chains of mountains, to hills of the lowest order. Formerly, mountains used to be represented by slight elevations in profile, which supposed the eye of the spectator to be in the plane of the map. At present, they attempt to represent in a bird's-eye-view the chains and groups of mountains, and even the peaks or insulated points which repose in general on elevations more or less considerable, but the whole extent of which presents contours that determine the form of valleys.[a] The new method would undoubtedly be preferable, if one could preserve a just proportion between the different elevations, and if we possessed all the necessary information for determining, point by point, the level of the ground. But, as long as these elements are wanting, the new method will be as arbitrary and illusory as the old one appears unnatural and unsatisfactory.

The partisans of the plan of representing mountains by a bird's-eye-view, show us the maps of D'Anville, and exclaim, "How vague and insignificant are these mountains, marked with insulated points! All that we see is, that the country they occupy is mountainous; one might as well write down: *there are mountains here;* nothing indicates the course of chains, their various sinkings, and their connexions, either with each other, or with the islands which form the summits of the chains of *submarine mountains*, or those which traverse the basin of the sea." But, in the first place, there are many other maps besides those of D'Anville, in which the mountains, though expressed in profile, please the eye and satisfy the mind. And we ask, in our turn, if geography has really gained by the admission of all these pretended chains, either terrestrial or *submarine*, which M. Buache, sen. has created, by supposing arbitrarily that all the basins of rivers are separated by considerable heights.

The pretensions of topography have been pushed still farther. A geographical engineer, M. Dupain-Triel, has published a method, by which a geographical map may be made to indicate the elevation of each point of the ground. He observes,[b] that if we join by a line drawn on a marine map, all the points at which equal soundings are marked, this line would give the contour of a section made at the bottom of the sea by an horizontal plane at such a depth below the surface of the fluid, as is expressed by the number of measures contained in the sounding. From this observation, just in itself, he thinks he may deduce a principle for representing *geometrically* the configuration of the surface of a country. This consists in tracing on the map to be constructed, lines which pass through points placed at the same level, or at the same height, above the surface of the sea; lines which would become successively the boundaries of its waters, if it rose, by any cause whatever, to the level they occupy; as the lines which join equal soundings would become in their turn the shores of the sea, if it sunk by the number of measures marked on those soundings. The heights of these lines or *horizontal sections of the ground* could be graduated, according to the scale of the map and the steepness of the slopes. On a specimen of maps of France executed according to this plan, M. Dupain-Triel traced in parts almost flat, and near the sea, a line passing through the points elevated 10 toises; then another passing through those elevated 20, and so on from 10 to 10 toises. We see these lines, at first pretty distant from each other, become closer in proportion as the country rises more rapidly. Round the insulated mountains, the line of level, which is marked only for differences of 50 toises, and even 100, come closer the more the slopes are steep. Table-lands are indicated by lines of level, which turn round them. Finally, if we conceive lines which cut the lines of level at right angles, we shall have the *lines of the greatest declivity*, or those which are followed in their descent by the waters spread on the sides of mountains.

Though this method of M. Dupain-Triel is not new, having been already proposed by Ph. Buache and others,[c] it undoubtedly merits some attention. It is evident that it furnishes descriptive geometry with means for resolving problems on the succession of table-lands, the intersection of slopes, and the meeting of basins; problems interesting in the construction of roads and canals. It might offer the means of collecting and putting within the reach of every body a multitude of levellings and observations, made by military and civil engineers, on the heights of mountains, the results of which are confined to the portfolios of government: finally, the advantage to be derived from it would excite travellers, and philosophers residing in all great towns, to multiply barometrical observations in order to determine the respective heights of the places where they are made. But, till the elements of such a map are more numerous and more authentic than those which we possess, its execution would only serve to give an air of reality to systematic ideas that are very uncertain. At all events, the confusion which would result from this multiplicity of lines, would prevent any object of political or historical geography from being clearly designed on these maps. We must therefore consign all inventions of this kind to maps, specially consecrated to physical geography, in the same way as the details of hydrography are reserved for nautical charts.

[a] Memorial Topographique et Militaire, cah. v.

[b] Dupain-Triel, Carte intitulée, Méthode nouvelle pour exprimer sur les cartes les hauteurs, etc. avec un mémoire de M. Du Caila. Paris, 1784. Id. Carte de la France, où l'on a essayé, etc. An. vii.

[c] Mem. de l'Acad. des Scien. 1752, p. 399 1753, p. 586; et 1756, p. 109

BOOK VII.

Continuation of the Theory of Geography. First sketches of Physical Geography. General forms and distribution of Continents and of Seas. External configuration of Mountains, Valleys, Plains, and Coasts.

HAVING considered the earth in regard to its dimensions, we must now study its PHYSICAL characters. This part of our work, which is perhaps the most interesting of all, will necessarily be the most imperfect; because a good system of physical geography, can only be the gradual work of many successive ages.

This science, before it can make advances to maturity, requires a continual series of observations, both repeated and varied, made in every part of the world, and so combined, as to leave no interval unoccupied.

On the other hand, it is not with natural geography as with mineralogy, with chemistry, or with botany. Ingenious arrangement, and exact and methodical classification, are scarcely applicable to it, and for the most part would only retard its progress, by loading it with a display of illusory notions. Mountains, valleys, waters, climates, and tracts of country, present themselves to the eye under very complicated and irregular appearances, which it is much easier to describe than to bring within exact definitions. The grandeur and majesty of nature, defy the subtilty of our combinations, and the littleness of our rules.

The spirit of physical geography, unquestionably rejects vague and incorrect language; but at the same time it cannot obviously be susceptible of the precision of terms, which belongs to mathematics or chemistry. What a striking difference is there between the winding, or the abrupt outlines of our mountains, and the regularity of geometrical figures? What an abuse has been made of the appellations *pyramidal*, *conical*, and others of a similar kind? How often has the term chrystallization been employed to conceal the insignificance of a shallow remark. This famous word, like the sword of Alexander, has enabled many to cut knots which they knew not how to untie. In the cabinets, almost every thing is chrystallized; in nature, almost every thing is irregular in its figure.

Even those objects which strike the eye most, are very difficult to be reduced under general terms. We commonly designate all elevations of land, that are the least prolonged, by the general name of *chains*. But it is certain that mountains more frequently form *groups* than chains; and even the most conspicuous chains are often composed only of a series of groups. Again, the same mass of mountains, which when seen on one side, appears to form a chain, is merely the declivity of a plain, more or less elevated. Travellers often give the name of mountains to the steep and lofty banks of rivers. It were endless to enumerate all the errors introduced by the mania of systematizing. There was a time when every black stone was considered as a volcanic production, and every circular pit as the mouth of a volcano.

The other departments of natural geography are equally enveloped in darkness. What shall we say of that system of hydrology which is almost destitute of any information as to either the levels or the depths of seas? The direct observations upon climates, are somewhat more numerous, at the same time we must acknowledge, that our thermometers do not indicate the latent heat, the influence of which is so great and so universal; and, besides this, even the best observations upon climate often lose half their value from want of an exact description of the surface of the country. The common systems of Botanical geography, by simply copying the "*Flora*" of each country, are as incomplete as they are useless. It is necessary to distinguish the elevation of the land, the quality of the soil, and many other local circumstances. If it appears more easy to determine the geographical relations subsisting between the different races of animals, now actually inhabiting the earth, what an abyss do we discover, when we attempt to examine the fossil remains of those genera which are now extinct, but which must once have peopled our planet? What revolutions have taken place! what mountains have been dissipated, what rocks decomposed! how many valleys have been filled up, how many lakes emptied of their contents, what inroads have the seas made upon the continents; what volcanic irruptions, what contests among the elements, slow or rapid, destructive or creative, must have preceded the actual state of our globe, a state which every where presents only the ancient ruins of an edifice, of the primitive proportions of which we are completely ignorant. Physical geography makes us feel the limits of our powers. We have ascertained the dimensions of the sun. We know the laws of gravity upon the surface of Jupiter. We have measured the elevation of the mountains of the moon: even the erratic comets seem to submit to the calculations of our astronomers. But the interior of that very earth upon which we walk, baffles our researches. We have never penetrated one two thousandth part of the diameter of the globe. Nay, even the very surface of the earth is not known to us throughout its whole extent. We shall perhaps for ever remain ignorant of the secrets which the two polar regions contain. Let us then endeavour to resist the seduction of systems, and detail with clearness, and above all with fidelity, the limited number of facts, which observation has collected, and which have passed the ordeal of sound investigation.

When we cast our eyes over a map of the world, we perceive, that the surface of the globe is divided into large masses of land, which we call *continents*, and great cavities, filled with water, which we term *seas*. As, in the parts covered with water, we observe small masses of land whose surfaces rise above it, which we name islands, so are there upon the continents small detached spots covered with water, which we call lakes. An island differs from a continent only in its dimensions; and in fact, we give the name of continent to certain portions of land, only because we have for a long time

remained ignorant, whether a ship could sail round them, and because some physical circumstances have hitherto prevented such a voyage.[a]

Many portions of the land and of the sea extend reciprocally the one into the other. If the sea penetrate into the interior of a continent, it forms there a *mediterranean* or inland sea, surrounded almost on all sides by land, and having only a narrow opening into the ocean. If the extent of such seas be less, and the openings larger, they are called *gulfs* or *bays*, two terms which geographical writers have wished to distinguish,[b] but which customary language more frequently confounds. The still smaller portions of sea, surrounded as it were by land, and which afford a shelter for ships, are called *ports*, *creeks*, or *roads*. The first term means a secure asylum; the second is applied to ports of much smaller size, and which, when improved or completed by artificial aid, are styled *harbours*, and the roads afford only a temporary anchorage and security from certain winds. If, on the other hand, parts of the continents shoot into the seas, and are connected with the main land by only a small portion of their circumference, they are named *peninsulas*, whose figures often correspond with those of gulfs and inland seas. When such masses of land are attached to the continent by a greater extent of line than one-fourth of their circumference, they are not considered as peninsulas. Arabia, for example, seems to deserve this name, but the custom of applying it equally to the advanced part of India, west of the Ganges, offends against exact description. It is thus, that nature sports with our classifications. If the projections of land reach but a little way into the sea, they are called *capes*, *promontories*, or simply *points*. A natural canal communicating with the sea at both ends, and confined by two opposite shores, is called a *strait*: the reverse is an *isthmus*, that is, a tongue of land running between two seas, and by which two masses of land are united. Many other terms of a similar kind, being used only locally, will be defined as we employ them in the course of our work.

Let us now consider the surface of the globe under one general point of view. We perceive, that it consists of one vast ocean, in which a great number of *islands* are placed, whose size varies from that of the most colossal to the most minute. Two of these islands are termed continents; that which is inhabited by the oldest civilized nations is called the *old continent*, and contains three divisions of the world, namely, Asia, Europe, and Africa, while the whole of the new continent is comprised under the name of America, though nature has divided it into two distinct peninsulas, one of which ought in strict historical justice to be called Columbia. In the midst of the most extensive mass of waters is placed New Holland, which many geographers call a third continent; although it is perhaps more correct to consider it as by far the largest island in existence. When we find a considerable number of islands grouped together, we give the name of *archipelago* to the whole. The vast archipelago which extends to the east of the ancient continent, and in the centre of which New Holland rises majestically, seems worthy of being considered as a new division of the world, which we shall distinguish by the name of *Oceanica*.

There is upon our globe, properly speaking, only one sea, one continuous fluid spread round the land, and which probably extends from one pole to the other, covering nearly three-fourths of the surface of the earth. All the gulfs, all the inland seas form only portions detached but not entirely separated from this universal sea, which we call the *ocean*. It is only for the sake of greater convenience that we distinguish different parts of this ocean under the name of *seas*. But this arbitrary and incomplete division is at the same time the occasion of ambiguity, and varies among different nations. We adopt the following classification, the simplicity and justness of which, can be easily verified by means of an artifical globe.

- **A.** *Great Austro-Oriental basin* or sea, occupying the greatest part of the aquatic hemisphere of the globe.
  - 1. *Austral Ocean*, or icy sea of the South. — Its frontier may be fixed by a line, drawn from Cape Horn to the Cape of Good Hope, from thence to Van Diemen's Land, and returning by the south of New Zealand to Cape Horn.
  - 2. *Oriental* or *Pacific Ocean*.
    - *a.* The *Great Archipelago*, or the part comprised between New Zealand on the south, the islands of Marquesas on the east, the island of Formosa on the north, and the straits of Malacca on the west.
    - *b.* *Northern Oriental Ocean*, between Asia and North America. The inland seas of Japan and Kamtchatka, and the sea of Behring, form a part of it.
    - *c.* *Southern Oriental Ocean*, from the islands of the Great Archipelago to South America.
  - 3. *Indian Ocean*. — With its different gulfs. The limits above mentioned mark out what remains for this section. The gulfs of Arabia, Persia, and Bengal form a part of it.
- **B.** The *Western basin*, forming a sort of channel between the two great continents.
  - 4. *Western Ocean*.
    - *a.* *Northern Ocean.* Its southern limit is formed by the department of France, called the Pas de Calais, by Great Britain, the isles of Faroe, and Iceland.
      The northern inland seas of Europe, and the northern icy sea, are branches of it.
    - *b.* The *Atlantic Ocean*; from the preceding frontier to the two points where the coasts of Brazil and Guinea approach nearest to each other.
      - Branches.
        1. The Mediterranean and its gulfs.
        2. The Gulf of Mexico, &c.
        3. Baffin's bay and Hudson's bay, or the seas of the Esquimaux.
    - *c.* The *Ethiopic Ocean*, between Brazil and Africa, as far as the line from Cape Horn to the Cape of Good Hope.

In following this division upon the globe, many general results will evidently strike us.

Is it not, in the first place, very remarkable, that one half of the globe should be covered with water, while the other half contains less water than land? In order to have under our view the whole of the aquatic hemisphere, we must turn the globe so that New Zealand may

[a] Kant, Géographie Physique, ii. part. 1, p. 67. Edit. de Vollmer.

[b] Fleurieu, Introduction au Voyage de Marchand.

form the highest point; or we must examine a map of the world, projected upon a horizon little distant from that of Paris:[a] the hemisphere, circumscribed by the horizon of our antipodes, presents to the view only some islands, some promontories, and some narrow lines of coasts in the midst of an immense sea; while the hemisphere bounded by our horizon comprises almost the whole of the land. If the masses of polar ice of the south do not contain some considerable islands, we can, by following the meridian of the Cape of Good Hope through the pole, till we reach the neighbourhood of Behring's straits, trace a line of two hundred degrees, or of four thousand marine leagues; a line exceeding by four hundred leagues half the circumference of the globe, and which passes over a surface entirely covered with water. A line drawn under the equator from Africa, through Sumatra and Borneo to America, passes over a surface of water, with only two or three interruptions, of four thousand two hundred leagues. Lastly, the fortieth parallel of south latitude affords an aquatic zone, interrupted only for fifteen degrees, and consequently forming a circumference of nearly five thousand three hundred marine leagues, a space little less than two-thirds of the periphery of the globe. Such is the vast extent of the Austro-oriental basin of the ocean upon our earth.

The form of the western basin is not less striking. It resembles a channel, narrowing towards the pole, and communicating with the Austro-oriental basin, on one side by the straits of Behring, and on the other by the large opening of the Ethiopic ocean. The Mediterranean Sea corresponds to the gulf of Mexico; the Baltic and Northern seas, are opposed to Baffin's and Hudson's Bays.

The distribution of water and land is also very unequal, if, without considering the forms of the two grand basins of the ocean, we compare the hemispheres, separated by the equator, or the northern and southern halves of the globe. We have found, by a pretty exact computation, that the land in each hemisphere and zone bears to the whole surface the following proportions:

In the icy zone of the north	0,400
In the temperate zone of the north	0,559
In the northern part of the torrid zone . . .	0,297
In the northern hemisphere	0,419
In the icy zone of the south	0,000
In the temperate zone of the south	0,075
In the southern part of the torrid zone . . .	0,312
In the southern hemisphere	0,129

Geographers and naturalists, about the middle of the 18th century, reasoned variously on this unequal distribution of land and water. They asserted the existence of a great southern continent, which was necessary to counterbalance the mass of land situated in the northern hemisphere.[b] But the voyages of Cook have put an end to all these conjectures. That navigator found, up to the 70th degree of south latitude, only one vast sea, containing many fixed and floating masses of ice, together with a few islands which had been mistaken for the promontories of the southern continent. There remains therefore towards the pole only about five or six hundred thousand square marine leagues, in which there can be any land, inaccessible to navigators on account of the ice;[c] but the whole of this mass would very little alter the proportion between the two hemispheres.

According to the opinion now generally admitted, that part of the land which is elevated above the surface of the sea, is so little in proportion to the immensity of the globe, that the effect of its unequal distribution upon the equilibrium of the globe is in fact nothing, or so small as to produce no sensible effect. Besides, it is possible,[d] that the sea towards the south pole may be less deep than in the northern hemisphere, and thus the tracts of land under the sea towards the south, may counterbalance the continental masses of the north, which are more elevated indeed, but surrounded by much deeper seas. This hypothesis would be more plausible, if the greater flattening of the globe towards the south pole, indicated by the measurements of M. La Caille, in Africa,[e] should ever be confirmed by corresponding measurements in America, and in New Holland; for then, that hemisphere being in general more depressed than ours, the ocean by its own tendency to establish a level, would spread itself over the surface of the southern land, which would be thus covered by the sea.

The two continents present a similarity of appearance in the direction of their peninsulas; they are almost all turned towards the south. This is the case with South America, California, Alascgha, Greenland, Acadia, Florida, Scandinavia, Italy, Greece, Arabia, India, Corea, Kamtchatka, and Africa.[f] Two remarkable peninsulas indeed, Iucatan and Jutland stretch towards the north, but they consist only of plains and alluvial land.

But tne general direction of the land is entirely different in the two continents. In the new continent it extends from pole to pole; while in the old the direction is more parallel to the equator; and if we examine only Europe and Asia, it is perfectly so. The longest straight line which we can trace upon the ancient con-

[a] See Le planisphère du Père Chrysologue de Gy, or the Atlas of this work.

[b] Bergmann's Physical Geography. I. p. 6. (2d edit. of Upsal, in Swedish,) Dalrymple's History of Navigation, Buffon, Buache, &c. &c.

[c] In February 1819, land was discovered by Mr. William Smith, Captain of an English brig, when his ship was in Lat. 62° 40° South, and Long. 60° West: he traced the coast for 250 miles, but it is yet to be ascertained whether this is an island of considerable size, or a part of a continent. It is by no means improbable that it may be connected with southern Thule, the most southerly part of Sandwich land seen by Captain Cook in 1775, and situated in 59° 30′ S. lat. and 27° 30′ W. long.—T.

This coast has been called New South Shetland. It extends from 44° to 63° W. longitude, in a direction of ENE, WSW. The land is broken and lofty, and is covered with snow and ice. It has been much frequented for the Seal fishery.—P. Captain Weddel, in a recent voyage, penetrated to 74° 15′ S. Lat. (34° 17′ W. Long.) when owing to the lateness of the season he was forced to return. From 65° to 69°, detached ice-bergs were continually occurring, so numerous about 69° as almost to impede navigation. From 72° 30′, southward, the ice-bergs entirely disappeared; and at 74° 15′ only three of them were visible from mast-head. This would seem to indicate that a part of the Australian Sea, at least, is unusually open.—P.

[d] Desmarets, Encycl. Method. Géo. Phys. i.

[e] See Book ii. p. 26.

[f] Bacon. Nov. Organ. L. ii. Aphor. 27.

tinent, running it as much as possible over land, commences, according to Bergmann, under the 61st degree of north latitude, near the mouth of the river Ponaschka in the sea of Anadyr, and crossing over the town of Nargun, the lake of Aral, and the southern part of the Caspian Sea, passes near the Persian Gulf, and to the north of the straits of Bab-el-Mandeb; it then traverses Africa, following the course of the mountains of Lupata, or the spine of the globe, and terminates at the Cape of Good Hope. It is 148 degrees, or 2960 marine leagues in length.[a] It inclines towards the east, at an angle of 65 degrees with the equator, and the parts of the continent, situate to the east and west of this line, are nearly equal. It is difficult to trace a similar line over the new continent. Bergmann makes it begin at 60° north latitude, and at 265° longitude east of the island of Ferro. He continues it, after Buffon, through Florida and the islands, to the mouth of the river La Plata. According to him it is one hundred and five degrees, or two thousand one hundred marine leagues in length, and is inclined towards the west, at an angle of sixty-eight degrees with the equator. According to the latest discoveries, this line ought to be prolonged ten degrees farther north; its length will then be 2300 leagues. But we cannot accurately represent the length of the new continent, except by a line containing many curves, in passing from the "icy cape" of Cook, through Mexico and Quito to Cape Horn. We shall then have a line of more than 3000 leagues in extent. This line will divide the continent into two very unequal parts.

If we were to suppose that the country round Baffin's Bay, and that discovered to the north of Siberia, form an uninterrupted continuation of the continent of America, the new world must approach much nearer to the Arctic pole than the ancient world. The frozen parts would thus be much more extensive, and the torrid regions much less than those of the old continent. The solution of the difference in the climates of the two great continents seems to depend upon this fact.

The peculiarities of the isthmuses that divide each continent into two very unequal parts, (Suez being composed entirely of sand, while that of Panama is formed by rocks of granite and porphyry,) lead us to remark a very singular difference in those two great islands of the globe. The ancient world is in almost every part equally open to the advances of the ocean, and from the straits of Behring to those of Bab-el-Mandeb on the one side, and to those of Gibraltar on the other, the bays, gulfs, inland seas, &c. are, as it were, in a sort of equilibrium, at least with respect to numbers; while the mass of Africa is not penetrated by one single arm of the sea. The new continent, on the contrary, having only one considerable gulf, that of California, or the Vermilion sea, on its western shore, presents on the opposite coast a chain of gulfs and inland seas; and when these are wanting, some immense river is found to supply the link. It is time, then, for geologists to cease from copying Buffon, when he would represent the two continents as exhibiting more breaks and inlets on the east side than on the west.

Let us now pass from this view of the inequalities which the horizontal profile of our globe exhibits, to an examination of those which result from a perpendicular section.

Mountains form the most considerable eminences on the surface of the earth, and have their descent more or less rapid. We must distinguish them from "plateaus," or upland plains, which consist of great masses of elevated land, commonly forming the centre of continents or of islands, but the sides of which are long and extended, and with but little apparent declivity. A plateau may have upon its elevated surface mountains, plains, and valleys. Some of them are sufficiently inclined to allow the waters which accumulate upon them to flow down; there are others which preserve the same level throughout a great extent, and where the rivers do not find any outlet. We meet with some plateaus of the latter sort in Europe, principally in Croatia and in Carniola, but they are of small dimensions. In order to see them in perfection, we must visit Tartary, Persia, and the centre of Africa.[b] These plateaus have their general level more elevated than the rest of the continent; they seem to be the most ancient masses of land, and, as it were, the *nuclei*, or kernels, round which the additional soil accumulated.

Mountains, in their exterior forms, present some varieties which strike even the most inattentive observer, and which, at first sight, may lead us to presume that there is some difference in their internal composition. The highest mountains most frequently present a surface of naked rock, but the nature of the rocks produces varieties in their sections and outlines: here, they shoot up into the form of enormous crystals, with sharp angles, heaped up and supported by each other; in another part, vast and elevated masses are crowned with circular summits, which rise into the air with less boldness. Sometimes there appears an immense steep and abrupt surface, which lays open to view, as it were, the entrails of the mountain itself. We describe these appearances under the names of needles, peaks, teeth, horns, domes, breaches, &c.[c] Next in order to these broken, arid, and steep summits, we see mountains, the forms of which bear a character of tranquillity, an indication of their slow and successive formation; these mountains, which are still considerable, formed by strata or layers variously inclined, generally exhibit an infinite variety of forms, in consequence of the changes to which, from numberless causes, they have been subjected. In one place, a vast amphitheatre is seen rising in majestic and regular gradation, like the Kinnegulla in West Gothland.[d] In another there is a large mass cut perpendicularly, and presenting the form of an altar like the table mountain at the Cape of Good Hope. There are mountains in China, which have the appearance of the head of a dragon, a tiger, or a bear.[e] In other places, you see a labyrinth of rocks rising like pillars, as at Adersbach in

[a] Phys. Geog. I. 3—5. Comp. Buffon, Preuves de la Theorie de la Terre, Art. 6. The line drawn by Buffon passes above the Icy Sea.
[b] See the articles *Tartary*, *Persia*, &c. vol. ii.
[c] Humboldt, Saussure, Pallas, etc. See the articles *Alps*, *Apennines* *Pyrenees*, vol. vi. Andes, vol. v, &c.
[d] Mem. de l'Acad. de Stockholm, 1747, pl. iii.
[e] Osbeck's Voyage to China, 266. in Swedish.

Bohemia, or in one single mass in the form of a large nine-pin, as Mont Aiguille in the province of Dauphiné.[a] We see some also near Envionne in the Valais,[b] which recal the figure of the old French frizzled wigs, (*perruques moutonnés.*) But the most common appearances are those formed by layers of stones, in an undulated or furrowed shape.

After these mountains of the second rank, we find hills more or less lofty, which, on all sides, present to the eye but little elevation, and a gentle declivity. These hills, furrowed by streams of running water, often gradually slope away, and at last lose themselves in the plains. Sometimes their sides are so rugged and precipitous as to produce on the mind almost all the picturesque effect of high mountains.

The peaks, or higher parts of mountains, formed by volcanic agency, differ very much from the usual forms. Their conical or pyramidal masses are distinguished by their regularity even when they have been broken off, or truncated, by some accidental cause. Their towering summits seem to menace the neighbouring country. The basaltic mountains also present an appearance not less striking, when they are not covered and concealed by other formations. Their sides display to the view close ranges of immense pillars or causeways, which seem to be the production of giants. The description, however, of all the forms which these rocks exhibit, would lead us away from the subject of this book.

There is, however, one eccentricity of nature, if it may be so called, which deserves to be noticed here, namely, mountains bored through. It is supposed that some of these perforations have been accomplished, in part at least, by the persevering industry of man. The Pierre-Pertuise in Mount Jura, and Pausilippo near Naples, are instances of this kind. But nature has left unequivocal marks of her power in other phenomena of this kind. The Torghat in Norway is pierced by an opening one hundred and fifty feet high, and three thousand long. At certain seasons of the year the sun can be seen darting its rays from one extremity to the other of this vault.[c] Near New Zealand there is a rocky arch through which the waves of the sea pass at high water. These phenomena differ from caverns, only from the circumstance of having a passage entirely through.[d]

Another general point of view, in which mountains may be considered, is their position relatively to each other. Some are completely insulated, more particularly those of a volcanic origin; it is the same also with those of a calcareous nature and some others. Both China and Ireland furnish many examples.[e] The rock of Gibraltar and the fortress of Gwalior in Hindostan are of this description. We may also mention Mount Aornos, where a whole people supported a siege against Alexander.[f] Mountains are seen most frequently in groups. Sometimes chains branch out from a common centre in angular directions. Sometimes the central mass itself is a lofty chain, straight or curved, whence, at intervals, secondary chains diverge;—the Alps may be placed in this class. Sometimes we see irregular groups of several chains, among which no one in particular can be ranked as the principal. Such are the collections of mountains in Asia Minor and in Persia. But the most remarkable sort is that of long connected chains, which, like the Cordilleras of the Andes in South America, continue for hundreds and even thousands of leagues, nearly in one constant direction, having on both sides regular layers or ranges of inferior mountains, but sending off very few secondary chains. These great chains evidently bear the stamp of the highest antiquity, and seem to be the silent witnesses of the creation; it is upon their summits and their sides that we can read the history of the globe in characters more distinctly defined, than even those which the Alps and the Pyrennees afford.

In general all the chains of mountains in the same continent, seem to have a mutual connexion more or less apparent: they form a sort of frame work to the land, and appear, in the origin of things, to have determined the shape which it was to assume; but this analogy, were we to generalise too much, would lead us into error. There are many chains, which have very little, or rather no affinity with any other. Such are the mountains of Scandinavia and of Scotland; mountains as independent as the character of the nations who inhabit them.

In making use of the word "chain," great caution is required. A chain may be defined to be a series of mountains, whose bases are continuous; but then we must not push the meaning of the word "base" too far. It would perhaps be of advantage to understand by this term only the visible foot of the mountain, or at most the interior strata, which can be easily traced near the surface. At any rate, we must beware of considering ranges of hills, or banks of sand, as continuations of chains.

We must, however, acknowledge, that the name of chains is not sufficiently general, and that it would be better to reserve this word for the subdivisions, and to employ the term "system of mountains," or "mass of mountains," to denote a collection or combination of many chains.

Mountains, whether insulated or in groups, exhibit on both sides declivities which are either gentle and long, or rapid and precipitous. We ought particularly to remark this general fact, that the greater number of the principal mountains have one of their sides very steep, and the other of a very gradual slope.[g] The Alps, for example, are much more rapid in their descent on the Italian side than on that of Switzerland. On the contrary, the Dophrines, or Scandinavian Alps, have a much steeper declivity to the west and north-west, than towards the south and east. The Pyrennees are steeper towards the south than the north; the mountains of the Asturias are the reverse; but those of the Sierra-Morena, and particularly the Alpujarras in Grenada, seem to be steepest and most abrupt towards the south.

[a] Lancelot, les Merveilles du Dauphiné, dans les Mem. de l'Acad. des Inscriptions, tom. ix.

[b] Saussure, Voyage dans les Alpes, sec. 1061.

[c] Pontoppidan's Natural History of Norway, i. 75—79, (in Danish.)

[d] *Isle Percée*, in the Gulf of St. Lawrence, near Cape Gaspe, is a perpendicular rock, perforated by two natural arches, through which the sea flows. Doreholm, in Shetland, is an insulated rock, perforated by a lofty arch, through which the sea flows.—P.

[e] Bergmann, Geog. Physique, i. 171.

[f] Quint. Curt.

[g] Delaméthérie, Theorie de la Terre, etc.

Mount Atlas and Mount Libanus border the Mediterranean with bold and craggy declivities. But, with regard to the latter at least, it is certain that towards the Euphrates it is far from steep. Mount Taurus (supposing it to terminate at the source of the Euphrates) exhibits two very different declivities; for in Caramania and Natolia, the descent is very abrupt towards the south, while there are some very extended upland plains, or plateaus, towards the north: in Armenia, on the contrary, the declivity on the north side is very rapid. The Ghauts, in the peninsula on this side the Ganges, have precipitous hills directly towards the west, and long and rather gentle slopes towards the east. Thus there is no constant rule; every thing depends upon local circumstances. In general this inequality in the declivities takes place only because the chains of mountains, when most distinct, are in a great measure nothing but the abrupt borders of long upland plains, or plateaus obliquely inclined, of which the surface of the globe seems to be composed. We ought also to distinguish the mountains, which descend by degrees, or successive banks, a circumstance attributed sometimes to the sinking of parts of the soil, which had been of a different nature from the rest, and sometimes to the action of the water which formerly may have flowed at the base of these mountains.

Valleys are formed by the separation of chains of mountains or of hills.[a] Those which are found between high mountains are commonly narrow and long, as if they had originally been only fissures dividing their respective chains, or for the passage of extensive torrents. The angles of their direction sometimes exhibit a singular symmetry. "We see in the Pyrenees," says[b] M. Raymond, "some valleys, whose salient and re-entering angles so perfectly correspond, that if the force which separated them were to act in a contrary direction, and bring their sides together again, they would unite so exactly, that even the fissure would not be perceived." This fact has been observed in the Alps for the first time by Bourguet, who has generalized it too much;[c] for there are some valleys, situated on a high level, totally different. We see some which have a great extent in length without being cut into any angles whatever, forming a sort of elevated plains; such are generally those which lie on the side of the principal chains, the Valais, for example. There are others which are large or swelling; Bohemia or Cachemire are instances of this sort. It is asserted, that they have been the basins of some ancient lake, which had become dry from the breaking down of the bank or dam formed by the surrounding mountains. This hypothesis, developed by Lamanon and Sulzer,[d] appears to be one of the best founded of any which geologists have proposed. There are also some highly situated valleys, containing rivers and lakes which have no outlets. There is a remarkable example of this in Peru, in the large valley which contains the lake of Titicaca. Central Asia abounds in such valleys. Several nearly of the same sort are to be met with in other countries; and many more will one day be discovered in the interior of Africa.[e]

High valleys present also some remarkable circumstances as to their form. Some have declivities equal on all sides; others slope only on one side, and to a great extent, while the opposite side is steep and abrupt. Most of these high valleys have their surface upon a level with the summits of the secondary mountains in the neighbourhood. The level of the lake of Joux, in a valley of Mount Jura, is considerably higher than that of the lake of Geneva.[f] In a few instances these high valleys are observed to widen gradually, and so to become identified with the plains. They are usually almost completely barred and confined by some projecting angle of the chain of mountains, which girds them in. The sort of narrow passage, by which we enter into these valleys, is called a pass or defile, and as formerly each valley contained a small independent nation or tribe, these passes are called by the French, "les portes des nations."[g] Such were the passes of Caucasus, the Caspian passes, the pass of Issus, rendered celebrated by the victory of Alexander; that of Thermopylæ, immortalized by the devoted patriotism of Leonidas and his band of Spartans; and the Caudinæ Furculæ, where Rome saw the glory of her unjust arms deservedly tarnished. There is between Norway and Sweden one of these passes, formed by several masses of rock, cut by nature into the shape of long parallelograms, and which have between them a passage, shut in by perpendicular walls. This pass is near Skiærdal. Another of the same kind is at "Portfeld," or the mountain of the gate.[h] These openings exactly resemble those by which the Hudson River in North America passes through successive chains of mountains, which seem desirous of checking its course.[i] The Cordilleras of the Andes present the most stupendous passes of this kind, that are known; they are from four to five thousand feet deep.[k] The lower valleys appear to us under a very different aspect; they widen as they recede from the secondary mountains from which they originate, and

[a] Excavated valleys are supposed to have been formed, either by the local action of water, or by the general action of diluvial currents. Messrs. Buckland and Conybeare have laboured to support the latter opinion; Dr. Fleming the former. The principal arguments, in support of the latter opinion, are, the existence of extensive valleys without any stream, or with one too small for such an effect: the uniform direction of valleys over an extensive district, very remarkable in the chalk, along the S. shore of England, where the valleys are dry, and terminate abruptly on the brows of high cliffs; the diffusion of beds of pebbles and bowlders along the course of valleys, and in one uniform direction from the same minerals *in situ*. Thus pebbles from the rocks in the NW of England, are spread over the valleys, opening through the oolite ridges of the midland counties, into the valley of the Thames, and for some distance along that river. Dr. Fleming believes, that in the first instance there may have been originally large streams flowing in valleys, now destitute of them; that in general, valleys follow the direction of the principal slopes of elevations; and that in general, the pebbles and rolled masses are derived from the rocks, in the course of the valleys, where they are found.—P.

[b] Observations sur les Pyrénées.

[c] Memoire sur la Theorie de la Terre, à la suite des Lettres Philosophiques sur les Sels et Cristaux, p. 181. Comp. Buffon, Hist. Nat. edit. 12mo. i. p. 105.

[d] Sulzer, Encyclop. Method. Phys. Geogr. i. art. Delamétherie, sect. 1514, &c.

[e] Lake Tsad, recently discovered by Major Denham, to the E. of Bornou, is probably without any outlet. However, its eastern shores have not been explored, and it may possibly communicate with the Nile.—P.

[f] Saussure, Voyages, p. 376, *sqq.*

[g] The gates of nations.—P.

[h] Bergmann, Geog. Physique, i. 185. Cronstedt. Description de la Iemptie, dans les Mem. de l'Acad. de Stockholm, 1763, p. 275.

[i] Kalm's Travels in America, iii. 161. (in Swedish.)

[k] Humboldt, Vues des Cordilleras, p. 9.

gradually lose themselves in the plains. Their opposite angles generally correspond very regularly, but these angles are very obtuse.

Plains, like valleys, are of two classes: the high plains, which are found between two chains of mountains, are frequently of great extent, and are placed as it were upon the shoulders of the secondary mountains; such are the elevated plains of Tartary, of Persia, and probably of the interior of Africa. The plains of Quito are 12,000 feet above the level of the sea: those of Karakorum, in Chinese Mongolia, are probably as elevated. Some of the low plains, whose soil is composed of sand, gravel, and shells, seem formerly to have been the basins of interior seas. Such are the plains on the north side of the Caspian, the large plain to the south of the Baltic, and that through which the river of the Amazons flows. The Tehama of Arabia, the Delta of Egypt and others of a similar nature, seem to have been once covered by the waters of the ocean and its gulfs.

The coasts or shores of the sea, and of lakes, deserve also great attention. These are the extreme limits of our systems of mountains. Some shores are broken and steep; this happens, when a mass of rock extends, either beneath or above the surface of the soil quite to the water; as in Gallicia, in Bretagne, in Norway, and in Scotland. This description of coasts admits of two subdivisions. 1st. We have those which are abrupt and broken, and as it were notched, formed by various masses of rocks united at their bases, either above or beneath the surface of the water:[a] these rocks often form clusters of islands, which surround the coasts; such are the "garden of the king," and "of the queen," near Cuba, the archipelago of Mergui in India, the coasts of New South Wales, the Skiergârd of Norway and Sweden. This class may again be subdivided according as the steepness of the shore arises from true granitic and other rocks, or from those masses of coral formed by the polypi which fill the seas between the two tropics. 2dly, We have coasts where the shore or boundary is equally steep above and below the surface of the water, leaving the sea itself quite free; these are, strictly speaking, the "steep coasts." Such, in general, are those of the Mediterranean and of the Black Sea: those of Dalmatia and some parts of the Archipelago more properly belong to the first division. America possesses scarcely any other variety of coasts on the side of the Pacific Ocean, beginning at Cape Horn and proceeding to Behring's Straits. This is the longest continuation of steep shores known upon the globe.[b] Mariners call a coast bold bluff, when it meets the ocean with a rapid declivity, and clear, when it is not bristled with rocks.

Low coasts are formed by land of a softer quality, approaching the water by a gentle and gradual slope. These may be thus classed; 1. Coasts formed by hills. Such are those of all the Danish islands, of Scania and Pomerania; we find there only low limestone bluffs. Shores of this kind seem more particularly to belong to lakes and small inland seas, although indeed the basins containing these are often surrounded by steep shores, as grand and bold as those which border the ocean. 2. Flat coasts, formed by sands and substances which the sea has deposited. These appear under the form of sandy or marshy plains, and extend a long way into the sea, leaving the water more or less shallow. They are, however, of various kinds. They are sometimes, like those in Gascogne and Jutland, coasts originally formed by hills, round which the sea has collected masses of sand, which are either fixed or shifting: sometimes they are a sort of downs,[c] formed by the sea, together with soil deposited by large rivers, as in Holland, in Egypt, and at the mouth of the Mississippi. A collection of slimy matter is also sometimes formed by the ocean, as in the flat and flooded lands on the shores of French Guiana. The low coasts are sometimes exposed without any natural rampart, to all the fury of the waves, and then we may, with Tacitus, be uncertain whether to regard them as constituting a part of the land or a part of the sea; others are secured by a chain of downs that are fixed and mingled with rocks like North Jutland. It was only by a skilful and persevering imitation of these natural barriers, that the Dutch recovered the soil of their country from the empire of the ocean.

Islands of great extent exhibit on a small scale the same appearances as the continents do on a large one. The smaller islands, however, deserve a distinct consideration. These may be classed in various ways. They are single, or in groups or chains. Among the low or flat islands, there are some which are only banks of sand, scarcely raised above the surface of the water; sometimes they consist of masses of shells or petrifactions, as the isles of Lachof to the north of Siberia, which are nothing but masses of ice, sand, and the bones of the mammoth. The greater number of the islands of the South Sea, formed, or at least enlarged by polypi, are composed solely of coral or madrepores. Among the more elevated islands, we find very many, which owe their foundation, in a great measure at least, to the action of volcanoes, which, after bursting forth from the original summit of the island, have continued to discharge lava from their crater in all directions, until by slow and gradual accumulation they have formed those vast and lofty peaks, which serve as land marks to the distant mariner. When groups of islands are placed near each other, we may fairly conjecture that they are only the different summits of one extensive submarine mass. So also, when they appear to follow one constant direction, they probably form only the eminences of a chain of submarine mountains. Such, when situated in the same line with the promontory of a continent, or with mountains on shore, may be considered as a continuation of the chain. Thus, it is evident, the Kurile islands connect Yeso or Jesso with Kamtchatka, in the same way as the great and small Antilles connect the two continents of America. But to make the observation hold, the intervals which separate the islands must either be very small, or be filled up with rocks and shoals beneath the surface, so as to preserve unbroken the continuity of the bases of these maritime mountains.

[a] Steep and indented coasts; these are girt with rocks, either above or below the surface of the water. M B.—P.

[b] This coast is lined from near 45° to 60° N. lat. by a chain or archipelago of islands.—P.

[c] The low and flat ground at Yarmouth, in Norfolk, between the sea and the river, is called the Danes or Daines, evidently from the French word "Dunes."—T.

Thus, the supposed connexion between the Canary Islands, the Azores, and mount Atlas in Africa, though possible, requires to be verified by repeated soundings, so as to discover the nature of the bottom of the intervening sea.

Mountains, in general, have no precise and regular direction. The chains, sooner or later, bend and deviate into a curve, and frequently lose themselves in plateaus, or upland plains.

We must not therefore give the reins to our imagination, and pretend to trace entire series of terrestrial and submarine chains, and thus form a frame-work for the globe, which has no existence in nature.[a] It is not sufficient to see upon a map, that there is in a particular place a division in the waters.[b] There are many such divisions in the world, which afford no traces whatever of mountains, but only of extended plateaus, or upland plains, which rise with a gentle inclination on both sides, often for the space of a hundred leagues. We meet with no lofty mountains, but a collection of hills, in the centre of European Russia, although this is the centre whence some of the largest rivers of Europe diverge. Nay, there is actually in Russian Poland, between the Niemen and the Dwina on one side, and the Dnieper and Dniester on the other, a point of division, which affords no sensible elevation whatever, and where, instead of the mountains laid down by Buache, travellers have discovered only a marshy plain; but about the middle of the course of the Dnieper, there is a mountainous elevation, consisting of pebbles and shells, which that river passes through, following a deep fissure or glen, in which it runs.[c] On the other hand, the Niemen passes round some hills of Eastern Prussia, much more elevated than the point of division of the waters, as is shown in Fig. 48, which is the profile of Europe, between the Baltic and the Black Sea. A total difference may be observed between this profile, and that which the same quarter of the world presents, bisected in the direction of the gulfs of Genoa and Hambourg, (Fig. 49.) and both these again form a contrast with that of the plateau of Mexico, (Fig. 50.) and of South America, (Fig. 51.) one of which is copied from the original, in the possession of M. Humboldt, and the other from a scale of heights, published in his travels. We may easily judge into what absurdities we may be led, should we have recourse to any general system whatever, for the purpose of discovering facts, of which observation alone can point out to us the astonishing variety.

The system of Buache has given rise to those chains of submarine mountains, which do not in fact exist, but which, nevertheless, make a figure in some theories of the earth. A detached island, a sand-bank, a reef of rocks at the surface of the water, are sufficient, in this author's opinion, to indicate a submarine chain, between two points of the world, however distant from each other. Nay, sometimes he has not deigned to assign any reason whatever for his conjectures. For example, he would represent Iceland, the Faroe Isles, and those of Shetland, as forming one submarine mountain between Greenland and Norway, notwithstanding that there is a deep sea between Norway and Shetland; and that from the direction of the mountains being parallel, and not converging, these chains could in fact never coincide. Besides, the basaltic nature of Scotland, of Ireland, of Faroe, and of Iceland, seem to point out an ancient union of the British Islands with Greenland, rather than with Norway. In the same way, the submarine chains of the South Sea, have in general a direction quite different from that which Buache ascribes to them, according to the uncertain discoveries of his time. They have not the least connexion either with Mexico or South America, any more than with the imaginary Austral continent. Many of these chains of islands, and particularly those which are the most insulated, have a very remarkable direction, but entirely opposed to the system of Buache; they extend from north-west to south-east, in the direction of the magnetic axis of the earth.

Let us however examine, notwithstanding the erroneous hypotheses of our predecessors, whether we cannot introduce general views more conformable to the truth, in our attempts to trace some sort of constant analogy, in the direction of the mountains of the two continents.

If we draw a line from the centre of Thibet, across Chinese Mongolia, towards Okotsk, and thence towards Cape Tchutchi, or the eastern promontory of Asia, this line will in general coincide with an immense chain of mountains, which run from the south-west to the north-east, and every where descend very rapidly towards the Indian and Pacific Oceans; while on the other hand, they extend themselves towards the Icy Sea, in plains and secondary hills. It is probable that we may one day be able to reduce to the same rule, the chain of Lupata, called the "Spine of the world," which is situated in Africa; at least, this chain runs from the Cape of Good Hope to that of Guardafui, in a direction of south-south-west, and of north-north-east, nearly in the same direction as the great chain of Asia; but we are still ignorant of the declivities of these mountains. We may consider the lofty and steep mountains of Arabia Felix[d] as the link which connects the mountains of Lupata with the plateaus and mountains of Persia, which come from Thibet.

From Behring's Straits to Cape Horn, if we follow the western coasts of America, we shall find one unbroken chain of the highest mountains of our globe. This chain occasionally bends a little into the interior, but it more frequently closely borders the ocean, with a range of steep and bold shores, and sometimes with the most tremendous precipices. On the other side, the outlets of lakes, and the direction of the great rivers, evidently show that nearly the whole surface of America inclines towards the Atlantic Ocean.

It follows from these combined observations, that the greatest chains of mountains upon the face of our globe are ranged in a circle round the Great Ocean, and the Indian Sea; that they more frequently exhibit steep and rapid descents towards that immense basin, which they

[a] Ph. Buache, Essai de Geographie physique, dans les Mem. de l'Acad. des Sciences, 1752, p. 399 Comp. Lehmann, Specimen chorographiæ generalis, tractus montium primarios sistens. Petrop. 1762.

[b] That is, a dividing line, on the two sides of which, the waters flow in opposite directions.—P.

[c] Hydrographical chart of Poland by Roustan and Komarzewski. Map of Rizzi-Zannoni. Notes by MM. Stibielowitz and Niemcewski of Wilna.

[d] Seetzen, in Zach. Astron. Corresp. xi. See "Arabia," vol. ii. in this work.

surround, and long and comparatively gentle declivities on the opposite coasts; that in short, from the Cape of Good Hope to Behring's Straits, and from thence to Cape Horn, the eye even of the most severe and scrupulous observer, cannot fail to discover some links of an arrangement, as astonishing from its uniformity as from the immense extent of country which it embraces.

Let us stop here for a moment, and consider this great fact of physical geography. If we suppose ourselves placed in New South Wales, with our face turned towards the north, we shall see America on our right, Africa and Asia on our left. These continents, which, not long since, we could not even in imagination, consider as at all approaching each other, being examined from this point of view, form, as it were, one whole, the structure of which, as far as it is known, exhibits in its grand features a most amazing symmetry. A chain of enormous mountains surrounds a vast basin: this basin, divided into two by a large mass of islands, frequently washes with its waves the base of this great primitive chain of the earth. But when did this immense chain of granite and porphyry shoot up from the bosom of the waters? Or when did those lofty secondary mountains sink into the depths of the ocean, and by their simultaneous submersion, form that steep and abrupt range of coast, which extends around the globe? Shall we suppose that the earth was formerly, like the planet Saturn, surrounded by a ring, and that this celestial vault, losing its equilibrium,[a] was precipitated upon the surface of the earth? But to what length will imagination wander, emboldened by seductive, but vague and inconclusive analogies? Let us then return to the old continent, and recollect, that the vast regions of India and China, contrary to such analogies, are placed to the south of this great girdle of mountains; that the peninsula beyond the Ganges even joins that astonishing group of broken and intersected countries, which fill the centre of the great basin; and that this is as it were the link which connects with the present continent, those grand remains of a former continent, of a hemisphere, in fine, which seems to have disappeared.

If again we consider under the same point of view the whole extent of the two continents, which, in regard to the great ocean, is placed beyond this principal chain of the globe, we shall perceive that the greater part of the plateaus, or upland levels, and of the chains of mountains, gradually incline towards the Atlantic and Northern Oceans. That extent of waters, vast as it is, appears then only like a canal, if we compare it with the great Pacific Ocean. The steep coasts which border the Atlantic, are nothing in comparison with those of the Cape of Good Hope and of Cape Guardafui, with the precipices which surround the seas of Kamtchatka, of Peru, and of Chili.

We may expect, perhaps, to find likewise a certain general analogy among mountains, in regard to their height; but we must at once confess, that we are still less acquainted with the real height than with the direction of the principal chains of mountains. Our measurements, whether taken trigonometrically, or from the comparative height of the barometer, have been made to no great extent, except in Europe and America. But in such general observations upon the whole of the globe, Europe cannot be regarded as a very important part, or as a standard of comparison much to be depended upon; because the summits of our Alps, such as Mount Blanc, Mount Rosa, the Ortelos, are elevated only about 14 or 15,000 feet, while those of the Cordilleras, Chimborazo, Antisana, and Pichincha, tower to the height of 19 or 20,000, is that a reason to conclude, that the new world has in general loftier mountains than the old, or that the mountains increase in elevation as they approach the equator? One of these conclusions is, and will continue to be doubtful, until the intrepid Humboldt has measured the Alps of Thibet, more elevated still, perhaps, than Chimborazo; the other is decidedly false, since the Andes of Chili are reckoned to be as high as those of Peru;[b] the volcanoes of Mexico are but very little inferior to those of Quito; and the enormous peaks of Spitzbergen and Greenland, appear to equal the Alps, and very much to surpass the mountains of Norway and Russia, to which, according to the hypothesis, they ought to be inferior. It is proper, therefore, to reserve, until we enter upon the description of the several parts of the world, the few general comparative observations suggested by those mountains whose heights have been already determined.

[a] Comp. Laplace, Syst. du Monde, l. iv. ch. 9. p. 255, 3d edit.

[b] Molina, Hist. Nat. de Chili.

BOOK VIII.

Continuation of the Theory of Geography. Of the Interior Structure of the Solid Parts of the Earth. Of Beds, Strata, Caverns, and Veins.

LEAVING the surface of the earth, which itself is so imperfectly known to us, and descending into its interior, our knowledge of which is still more confined, we are now about to consider the solid crust of the globe, in so so far as it has been examined in reference to its interior structure, and the substances of which it is composed.

To whatever depth excavations have been made in different countries, they have uniformly shown that the greater portion of the earth consists of strata of materials of different natures, irregularly disposed. When these strata are of a similar nature, and of great thickness, they are called beds or banks (*bancs.*) If they preserve a horizontal position, we call their subdivisions layers (*assises.*) But, although we find, even upon the highest mountains, beds, if not layers, the almost vertical position of the principal masses of most of the higher mountains, obliges us to give them the name of blocks (*blocs,*) although this name by no means points out the nature of these masses, which some regard, with much probability, as enormous crystals,[a] while others affect to consider them only strata changed in their position.[b] Sometimes the blocks are divided by vertical fissures, and then their portions may be called leaves, or laminæ, (*feuillets* or *lames.*) We regret that these terms convey no precise and fixed meaning; but we also acknowledge, that, in contemplating the objects of nature, it is impossible to submit them to a more rigorous classification.[c]

The different masses which we have just indicated, are thrown one upon the other in every possible manner, both horizontally and at every angle. Frequently in moderate elevations, and more particularly in low lands, the different strata preserve, for hundreds of leagues, a parallel position; thus the limestone or calcareous strata containing numerous shells, upon which the city of Paris is built, extend across what was formerly called the Isle of France, as far as Belgium.[d] The gypseous strata of Montmartre, and of the heights of Belleville, have the same degree of elevation, though separated by a valley. In Champagne, a large bed of chalk runs nearly upon the same level from Rhetel to Sens.[e] Even the most perfectly crystallized rocks appear sometimes to follow a horizontal direction. A ridge of granite seems to extend straight from the Limosin, by Poitou, to Cherbourg in Normandy.[f] Another girdle or band of granite follows the valley of the Upper Loire from Creuzot and Mount Cenis to Saint Etienne through a space of seventy leagues.[g] The rocks of trapp in Westrogothia are found upon the same level in mountains separated by extensive plains. In the island of Rugen in Pomerania, in the Danish island of Mœn, and at Stevens in Zealand, the strata of chalk and flint correspond with each other, though an open sea flows between their bases. What confusion, nevertheless, do we find by the side of this tranquil regularity of formation! What traces of destruction at once alarm and delight the observer of nature!

In the plains, and on moderately high mountains, we meet with strata that have been entirely inverted, or partly shifted from their first position, bent in every shape, crooked and curved, and returning upon themselves; the mountain of Saint Gilles near Liege exhibits all these anomalous appearances.[h]

We find considerable strata in Mount Jura, which, having been overturned or pushed forward upon others, have stopped in a position so precarious, that the application of the least force would put them again in motion.[i] The Alps exhibit a striking spectacle of disorder and confusion. We discover pyramidal mountains, like the needle of the south,[k] the layers of which are ranged round the axis of the pyramid like the leaves of an artichoke, if we may be permitted to compare those enormous rocks to a small vegetable.[l] Nant d'Arpenaz presents to our view a sort of hemisphere, composed of regularly curved strata.[m] At every step, the rules which appear most generally followed, are broken and set at defiance by the greatest possible diversity. If Mount Blanc be composed of enormous vertical blocks, Mount Rosa, equally gigantic, presents only horizontal strata, a little inclined.

These strata are almost all intersected by fissures and cavities more or less considerable. Some consist of interstices left between two ancient rocks at the moment of their crystallization; the great majority appear to owe their origin either to the retiring or sinking of the earth. The first of these causes has considerably increased them in the calcareous mountains of secondary formation; they are less frequent in gypsum. Some of these fissures have been filled with metallic substances, some by the filtering of water impregnated with stony matter, others by incrustations, by alluvial minerals, by vegetable, and animal earths; lastly, some have

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[a] Delamétherie, Théorie de la Terre, sec. 1339, *et seq.* Patrin, Hist. Nat. des Mineraux, i. 103.

[b] Saussure, Voyage dans les Alpes, sec. 604—669. Compare his opinions, sec. 1691 and 2300. Deluc, Lett. Géolog. à Blumenbach, p. 123. (En Fran.)

We have adopted the terms of our author, though they by no means coincide with those used by our own writers upon geology and mineralogy; but, in order to prevent mistake, we have in general given the French term also.—*Translator.*

[c] Bergmann, Géog. Phys. i. 197.

[d] Cuvier et Brongniart, Annales du Muséum, vi.

[e] Linck, Voyage en Portugal, i. 48. Dupin, Statist. des Deux-Sèvres, 105. Journal des Mines, No. viii. p. 27—29.

[f] Delamétherie, Théorie de la Terre, iv. sec. 954, sec. 1154.

[g] Bruslé, Statist. de l'Aube, p. 6.

[h] Delamétherie, 1. c. sec. 1382, 1383, pl. vi. &c.

[i] Bertrand, Nouv. Princ. de Géologie, p. 182.

[k] "*Aiguille du midi.*"

[l] Saussure, Voyage, sec. 569.

[m] Ibid. sec. 473.

remained open, and form ravines, precipices, abysses, when they are open to the sky; or caverns and grottos, when they have walls and a natural roof.

In another part of this work, we shall point out and occasionally describe at length the most remarkable caverns and grottos of our globe; but we must here confine ourselves to general views. There are some very considerable caverns; frequently the first excavation is only the vestibule to another much deeper and larger, but the dimensions of caverns have generally been much exaggerated. The depth of that of Eldon Hole, near Castleton in Derbyshire, has not been discovered, though sounded with a line of more than 9600 feet.[a] Near Frederickshal in Norway, there is a hole, into which, if stones be thrown, two minutes appear to elapse before they reach the bottom, from which it has been concluded that the depth was 11,000 feet.[b] Among the numerous caverns of Carniola, that of Adelsberg is said to afford a subterranean walk of two leagues; but this computation of rather too enthusiastic a writer requires to be confirmed.[c] Many caverns are remarkable for various natural curiosities. There are some from which, in summer-time, an ice-cold wind issues with astonishing force. Mount Eolo near Turin in Italy is an example of this.[d] There are others, the walls of which are in August covered with ice, which melts in December. There are two or three of them in France that have attracted notice; among others the grotto of Notre Dame de Balme near Grenoble.[e] The little communication which these caverns have with the external air, causes them to change their temperature long after it becomes changed upon the surface of the earth. The most interesting caverns, and the most curious for their natural productions, are certainly those from whose roofs water drops, impregnated with calcareous matter, and which, either soon hardening, remains suspended from the vaults of the caverns, in the shape of long crystals, or falling to the ground, assumes a thousand fantastic forms, often representing various vegetables and animals. It is to this circumstance that the grotto of Antiparos owes its celebrity. The naturalist prefers those caverns which contain petrified bones. These are the visible portions of vast burial places, where the revolutions of the globe have deposited whole generations of living beings.[f] We are also acquainted with some caverns, whither certain species of marine animals withdraw, when they feel themselves about to expire.

There are caverns which contain deep pits of water, or wells, sometimes so extensive as to acquire the name of subterraneous lakes. There are others from which rivers derive their source: while some are known to receive very considerable streams, which lose themselves in the interior. Such are the innumerable cavities of the Julian Alps, in Carniola and Croatia. It is to similar reservoirs that we must attribute the periodical disappearance of the lake of Cirknitz.[g] There are some caverns in Norway, where, as you walk upon an arched calcareous floor, you hear the roar of invisible torrents under your feet. Many caverns in Russia and in Siberia, have been evidently formed by means of water, and even masses of ice.[h]

Volcanic caverns form a distinct class. That of Surtur in Iceland, which is 5034 feet long, has three of its sides, or walls, covered with a greenish black varnish, formed by a volcanic vitrification. Long pieces of lava are suspended from the roof, which is so chinky in many places, as to admit the rays of the sun.[i] The most magnificent of all known caverns, is doubtless that called "Fingal's Cave," in the isle of Staffa, on the western coast of Scotland. Thousands of majestic columns of basalt support a lofty roof, under which the sea rolls its waves, while the vastness of the entrance allows the light of day to penetrate the various recesses of the cave.[k] The origin of these caverns with basaltic columns, is as uncertain as that of basalt itself, which has occasioned so many discussions among geologists.

The causes which have produced those cavities have unquestionably had a sphere of activity to which our observations are far from being commensurate. Many phenomena, particularly earthquakes, seem to indicate the existence of much more considerable cavities than those which are known to us. But the wisest course we can pursue, is to acknowledge our perfect unacqaintance with their nature. We no longer live in an age when Athanasius Kircher dared to describe the subterraneous world, as if he had travelled through it in every direction. The *unknown* is now banished from the land of science, and is become the exclusive patrimony of romance-makers.

The small fissures which pass through the masses of rocks, and which we call by the general name of veins, although they present to the imagination a less striking appearance than that of caverns, yet to the eye of reason and of science, exhibit a still more complicated enigma. The essential character of a vein, is that of cutting or passing through a mass of rock, in a direction more or less different from that of the strata or layers, of which the rock or mountain is formed, and being filled with a mineral substance different from that of which the rock itself is composed.[l] We sometimes find veins of twenty or thirty feet in thickness, while others are less than an inch. Some continue for the space of several leagues, others divide and disperse themselves in smaller veins. There are cases in which the veins, after having passed through many strata, suddenly break off at the commencement of a stratum of a particular sort, and re-appear on the opposite side, exactly in the same direction, and of the same thickness that they had at first.[m] The general line of veins is rectilinear, but without any preference as to direction. In the middle class of mountains, they follow the direction of the valleys. The matter with which the vein is filled, frequently contains metallic ores, and is then called *Gangue*, or that part to which the metal adheres.

[a] Lloyd, Phil. Trans. 1771, vol. lxi. part i. No. 31.
[b] Pontoppidan's Natural History of Norway, i. 101.
[c] Valvasor, Gloire de la Carniole, 1699.
[d] Kircher, Mund. Subterran. lib. iv. 239. (Compare the Grotto of Motiers in Bernoulli's Description of Neuchâtel, p. 32.)
[e] Mem. de l'Acad. des Sciences, 1755, p. 149, &c.
[f] See Note, p. 102.
[g] Hacquet, Voyages dans les Alpes Juliennes.
[h] Pallas, Voyages, i. 41, 56, 166. (en All.) Lepechin, Gmelin, &c.
[i] Olafsen, Voyage to Iceland, i. 127. in German.
[k] Faujas de Saint Fond, Essai de Géologie. ii. planche.
[l] Werner's Theory of Veins, in German, translated into French by Daubuisson, § 2. Oppel, Géometrie Souterraine. Ibid. § 15. § 19.
[m] Ferber, Oryctography of Derbyshire, 19, 20. Werner, § 73

There is scarcely any mineral that is not found in some vein or other, more or less abundantly. Some also contain petrifactions, which seems to prove, that these fissures were originally empty, and had been filled from above, by means of a fluid loaded with various substances, which it deposited in them. This is the opinion of the celebrated Werner, and what is most generally admitted; it is however disputed by those, who consider minerals as produced by means of subterranean exhalations,[a] or from some fermentation in the mass of rock, capable of transmuting the nature of its substance,[b] or lastly, from the general crystallization of the globe.[c] Some philosophers have regarded metallic veins as branches of a grand metallic trunk, concealed in the interior of the globe, and to which they have attributed a sort of vegetation, or organic motion.[d] The theory of veins, however, according to every supposition, is very difficult to comprehend. We will now return to the consideration of mountains in general.

The thickness of the various strata, differs as much as their inclination or position, and as their fissures. The bank or bed of trapp in Westrogothia, is in many places a hundred feet thick, and in the Alps there are some masses still thicker: but it is not agreed whether these masses are to be considered as regular strata. Many of the middle class of mountains contain beds of mineral or rock-salt, of alum, and of coal, thirty or forty feet thick. But there are also some strata of coal near Liege, which are not more than an inch in thickness. White and black marbles are found in thicker strata than those which are variegated; and in general those substances which are least mixed or compound, are found in the greatest masses.[e] In Europe, continued strata or beds, of the thickness of three thousand feet, are extremely rare, but in Mexico or Peru, there are masses of porphyry, which are from 9000 to 12,000 feet thick.[f] This massive structure seems to be the peculiar character of the regions, which form what we call the great chain of the globe.[g]

It remains for us only to consider the various strata of the earth, in regard to the order of their supra-position, but although this is intimately connected with the subject at present before us, the structure of mountains, it is very difficult, if not impossible, to treat the matter so as to be distinctly understood, without anticipating the observations to be made, when we come to examine the origin and nature of the substances, of which the strata are composed.

We call those beds or strata *primary*, which are found at the greatest depths to which man has been able to penetrate. These masses do not in general contain any traces of animals or vegetables; and in this point of view they may be called *primitive*, or *primordial*. The next order, or that of *secondary* strata, comprehends all those masses which form mountains, and are placed in regular strata or layers, containing the remains of animals and vegetables, and lying or resting upon the primary strata. The third order consists of such beds as contain fragments of secondary strata, mixed more or less frequently with the materials of the primitive class. They lie above the secondary strata,[h] and are heaped together in a more confused manner.[i]

We will now consider more particularly the composition of the primitive strata.

The roughest, the most elevated, and most extensive mountains of our globe, contain masses of granite, which cannot correctly be called strata, and which very frequently terminate in vast cupolas. Next to these enormous crystals, we see very large and almost vertical banks or ridges of laminated granite,[k] and of pure schist,[l] that is, without any mixture of vegetable or animal remains. It is the extremities of these broken masses of laminated granite, which form the most acute and angular peaks. The schist is frequently intersected by numerous metallic veins. Large beds of pure calcareous matter are found in general to run more horizontal, and they give rise to those long ridges of mountains, which are quite free from metals. Masses of porphyry, syenite, and other homogeneous rocks, are generally placed upon one or other of the preceding strata. In America, enormous beds of porphyry repose upon granite, and form the summits of the Cordilleras.

The order which all the primitive rocks observe among themselves, is not yet determined by observation. Granite is almost universally considered as forming a sort of vault surrounding the globe, and supporting all those masses, which seem to have been heaped upon it by the double action of a general crystallization, and a violent jumbling. We have never yet found granite lying upon porphyry, upon schist, or upon any other rock whatever;[m] but the relative order of all the other rocks seems to vary much. The only principle that appears to be determined is, that the primitive or primordial rocks are never placed in great masses upon the others, while the others are constantly found accumulated upon them.

At the base of these mountains of the first order, and

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[a] Henckel, Pyritology, ch. 13.
[b] Trebra, Observations sur l'Interieur des Montagnes, (en All.)
[c] Delamétherie, Théorie de la Terre, § 1353.
[d] Lehmann, Traité des Matrices des Métaux, Berlin, 1753.
[e] Bergmann, Géog. Phys. § 45.
[f] Humboldt, Tableaux des Régions Equatoréales, 128.
[g] See Book vii. p. 65.
[h] Werner, Classification des Roches, Dresde, 1787. (en All.) Voight, Minéralogie Pratique, 1792, (en All.) See also the works of Saussure, Dolomieu, Humboldt, Deluc, &c. &c.
[i] Rocks have more generally been arranged into the classes of Primitive, Transition, Secondary, and Tertiary; above which are placed the Diluvial and Alluvial formations. See Note b, p. 87.—P.
[k] Gneiss and mica slate.
[l] Argillite.
[m] Granite has been found superimposed upon the more recent formations, even upon the fragmentary rocks. Transition granite is found in several places in Scotland, along with porphyry and sienite, in connexion with the graywacke and clayslate formations. Von Buch observed, near Christiana, in Norway, the following order of superposition, from below upwards, viz. gneiss, clayslate and limestone, granite, clayslate and limestone, graywacke slate, flinty slate, sand-stone, porphyry, granite, zircon sienite. The limestone was partly white and crystalline, imbedding tremolite, epidote, garnet, &c. and partly black and compact, containing orthoceratites, pectinites, trilobites, &c. Consequently, granite is there found above aggregated rocks, and others containing organic remains. The following arrangement has been observed at Recaro, Italy, by M. Marzari, from below upwards, viz. mica slate, dolerite (greenstone,) red sand-stone with coal and bituminous marl, magnesian limestone, porphyritic sienite; and in the valley of Aviso, the following, viz. graywacke, porphyry, red sand-stone, magnesian limestone, Jura limestone or oolite, granite and augite rock without olivine. According to Breislac, the granite superimposed on magnesian limestone (containing organic remains,) is the same as the fine Egyptian granite, and contains great masses of quartz and imbedded tourmaline. These apparent anomalies may be accounted for, by considering granite as a volcanic product, ejected from beneath through the upper strata.—P.

sometimes also at a considerable elevation on their sides, we commonly find calcareous rocks *of transition*, that is, rocks, which in part seem purely calcareous and partly mixed with animal remains. These rocks mark the transition of masses which do not exhibit any regular continued strata, into those rocks which geologists call stratified, the structure of which consists of a series of strata or layers. There are also some other rocks which indicate this transition; these are the recompounded fragments of the pure or primitive rocks, united anew by a species of cement, several varieties of which have been facetiously called pudding-stone, and *amygdaloidal* or almond rocks, from the appearances which they present.

The secondary rocks, formed commonly in regular strata, give a peculiar and characteristic appearance to the mountains which are composed of them. Their outlines are less broken than those of the primary mountains, their summits less lofty; but vegetation displays its richness upon their gently inclined sides of chalk and clay, covered very frequently with a layer of marl, and filled with the remains of animals and vegetables, different from those now existing in a living state. The argillaceous schist bears the marks of an entire vegetation anterior to the present constitution of the globe. In the marly-bituminous schist, we meet with petrified fish and many impressions of aquatic animals; and the calcareous rocks contain the bones of quadrupeds. These three strata, and others which are analagous to them, frequently succeed each other in such a manner, that the remains of vegetables are placed below, and those of quadrupeds nearest the surface.

There are some rocks which follow no regular succession, such as the siliceous sand-stone, (*les grès*,[a]) which contains few organic remains, but which, from the diversified arrangement of its strata, seems sometimes to approximate to the primitive rocks, and sometimes to those of the most recent formation. Gypsum, (sulphate of lime,) or plaster of Paris, is also a substance, which is met with sometimes in one order of succession, and sometimes in another. Vast masses of it are found among the primitive rocks.[b] [c] What chiefly characterizes stratified mountains, is rock or mineral salt, saline springs, mineral waters, layers of coppery schist, alumine, calamine, bituminous earths, with petroleum, or rock oil, and naphtha; and lastly, coal; all these substances are accumulated in layers or beds, the succession of which constantly varies, but which all belong exclusively to stratified mountains. On the other hand, these mountains contain no metallic veins.[d]

In the same manner as the regularly stratified masses are supported by crystallized primitive rocks and are placed upon them, we also see at the bases of mountains composed of strata, rocks of a third order, which in fact are also arranged in layers, but without that uniform composition, or that regular cohesion, which makes each layer of the stratified rocks a whole of itself. These strata or beds, which we call *tertiary*, are also found in the midst of a confused mass of small portions of substances, which seem to have been accumulated by some fluid, that has transported, or at least rolled and mixed them together. These form the bottoms of valleys, and are almost always placed upon the stratified rocks. *Tufa*, which is formed by the recomposition of the particles of a primitive or stratified rock, *conglomerates*, or *breccias*, of the third order, which are heterogeneous compounds of the fragments of rocks united by a cement of tufa, clay, sand, and gravel, are the principal strata of this kind.

The remains of large quadrupeds and other analogous animals now unknown in a living state, are found in these beds; there also are seen those vast quantities of peat or turf, (*tourbe*,) which are the remains of a recent vegetation mixed with bituminous earth. Minerals and metals are no longer met with, either in beds or veins; but only disseminated in minute particles.

In these alluvial or transported soils, as they are too vaguely called, it is natural that the layers of lighter matter should occupy the surface, while the heavier substances should accumulate in the interior. But the former are often seen at very considerable depths, so that there are in alluvions, as in stratifications, many orders of succession. Thus, from the summits of Mount Blanc to the marshes of Holland, and the heaths of Lunebourg, the interior structure of the earth constantly preserves this complicated and enigmatical character, which not only perplexes our reason, but seems to baffle our imagination.

Besides these distinct beds, or strata, the earth presents to us a great number of confused masses.

All the banks of rivers and lakes, and the shores of the sea, are covered with pebbles, rounded by the waves which have rolled them against each other, and which frequently seem to have brought them from a distance. There are also similar masses of pebbles found at very great elevations, to which the present sea appears never to have been able to reach. We find them in the Alps at Valorsine, more than six thousand feet above the level of the sea; and on the mountain of "Bon-Homme," which is more than a thousand feet higher.[e] There are some places little elevated above the level of the sea, which, like the famous plain of Crau in Provence, are entirely paved with pebbles; while in Norway, near Quedlia, some mountains of a considerable magnitude seem to be compietely formed of them, and in such a manner, that the largest pebbles occupy the summit, and their thickness and size diminish as you approach the base.[f] We may include in the number of these confused and irregular heaps, most of the depositions of matter brought by the rivers or sea, and left on the shores, and perhaps even those immense beds of sand which cover the centre of Asia and Africa: And, in general, it may be said,

[a] "Grès" is translated *silex* or *flint*, and also *free-stone* or *sand-stone*; the latter is the most correct.—T.—*Grès* is properly sand-stone. It has no other primary meaning in the *Dict. del' Academie*.—P.

[b] Dolomieu, Journal de Physique, 1794, p. 183.

[c] It is also found abundantly in the new red sand-stone, in connexion with fossil salt; and in some of the tertiary formations, particularly the lower fresh-water formation of the Paris basin.—P.

[d] This assertion is not founded in fact. Metals are more abundant in the older rocks, and more generally occur there in veins. In the newer stratified rocks, they occur oftener in beds or disseminated, but frequently in veins. In the newer unstratified rocks, greenstones, porphyries, &c. they are generally in veins. As an example of metallic veins in secondary stratified rocks, we may quote the lead-mines of Derbyshire—veins of galena, in compact shell-limestone.—P.

[e] Saussure, Voyage, § 690.

[f] Bergmann, Geog. Phys. i. 207.

that the third order of beds or layers, very nearly approximate to these confused accumulations. It is this circumstance which renders so uncertain the distinction which it is nevertheless necessary to establish, between alluvial masses created before the commencement of history, and those which we still see forming under our own eyes.

There are, notwithstanding, some substances, the distinct character of which leaves much less room for hypothesis. Such are lavas, the well known productions of volcanos, which are found spread above all other strata around the craters, which have ejected them, like so many streams around one common source. The black-looking torrents of these substances, which have been liquefied by the volcanos now existing, exhibit sometimes shapeless masses, either compact or porous; sometimes they assume the appearance of crystallization, or a separation into tables, or into roundish blocks: they are often only one mass of scoriæ, or ashes, which, united by a sort of cement, form what may be called volcanic tufa.[a] The strata or layers, which we observe in lava, and which are commonly separated by thin intervening layers of vegetable mould, indicate the number of volcanic eruptions which have successively produced these different strata. None of these appearances are common to those celebrated substances known under the name of *basalt*, and which many naturalists call prismatic lava. This substance, always formed or divided into prisms, is seen in the form of columns, sometimes elevated perpendicularly, as in the cave of Fingal and the Giants' Causeway; sometimes inclined towards the horizon at different angles, as in the Vivarais; sometimes lying horizontally, ranged like logs of wood, and enclosed in fissures, as in the Feroe islands,[b] or free and unconnected like the basaltic circle in the island of Mull.[c] But basalt is never placed in large masses upon strata of the third order.

The fragments of granite and other pure rocks, thrown here and there upon stratified rocks, and even upon alluvial lands, exhibit a phenomenon as indisputable as it is astonishing.[d] All the chains of Mount Jura, all the mountains which skirt the Alps, the hills, and even the plains of Germany and Italy, have blocks of granite scattered over them, frequently of large dimensions, and always of as pure a composition, and as beautifully crystallized as the granite of the highest Alps.[e] The same phenomenon is also repeated in the plains of Russia, Poland, Prussia, Denmark, and Sweden. From Holstein to eastern Prussia, upon the alluvial lands, of sand and clay, an immense number of blocks of granite are found. Near the island of Usedom, many detached masses of granite rise up from the bottom of the Baltic.[f] We see the same thing in Scania and in Jutland, which are so full of these fragments, that they use them for enclosures, for houses and churches. These blocks are rounded by the action of the heavy rains. In Lymfiord, a gulf of Jutland, and at some points on the western coast of that peninsula, sharp peaks of granite shoot up from the bottom of the sea. But what is most remarkable, is to see enormous masses of granite placed upon the summits of of the calcareous mountains of Rettwick, of Roedaberg and of Osmund, which are near six thousand feet above the level of the sea, and which consequently are among the highest mountains in the north of Europe.[g h]

If this phenomenon has not been noticed in all the regions of the globe, we must perhaps attribute it to the few observations which travellers have made upon this subject.

The structure of the globe, of which we have been endeavouring to trace the grand features, presents in all its parts the appearance of a vast ruin; the confusion and overthrow of most of its strata, the irregular succession of those which seem to remain in their original situations, the wonderful variety which the direction of the veins and the forms of the caverns display, the immense heaps of confused and broken substances, the transportation of enormous blocks to a great distance from the mountains of which they appear to have formed a part, every thing, in short, makes us feel, that the history of our globe reaches back to periods far anterior to the existence of the human race, and that the researches which are necessary to bring us acquainted even with the present state of its surface, (and scarcely beyond the surface can we penetrate,) would require a length of time, and an amount of expense hardly to be calculated, before our observations could be so matured and verified as to form the foundations of a complete scientific whole.

[a] Faujas Saint-Fond, Essais de Géol. ii. 413, *et seq.*

[b] Memoirs of the Society of Natural History of Copenhagen. See the description of the Feroe Islands. Vol. vi.

[c] Faujas, Géol. ii.

[d] The position of these blocks or bowlders of granite, has given rise to much speculation on their origin. The granite blocks scattered over the sandy region along the S. shore of the Baltic, from the N. sea to the plains of Russia, and those in Jutland, Scania, and Finland, are to the S. of the great primitive region of N. Europe. Those scattered over Italy have the same relation to the Alps. In N. America, they are scattered over the low country along the Atlantic coast, to the S. and S. E. of the primitive region occupying New England and the E. slope of the Alleghany mountains, over the shell-limestone along the Mohawk, S. of the granite mountains W. of Lake Champlain, and along the S. shores of the upper lakes, along the N. shores of which, the rocks are primitive. These facts have led some geologists to believe, that they were transported by a diluvial current from the N.; either by the simple force of the current, or imbedded in icebergs. On the contrary the granite blocks so abundantly spread over the Jura and N. Switzerland, are N. of the Alps, the nearest primitive region.—P.

[e] Delamétherie, Théorie de la Terre, § 1188, *sqq.* Ferber, Dolomieu, &c.

[f] Wrede, in Zach. Correspond. v. 456.

[g] Bergmann, Géog. Phys. i. 265.

[h] See Note, p. 69.—P.

BOOK IX.

Continuation of the Theory of Geography. Of the simple Substances which compose the solid part of the Globe. First Section: Saline, earthy, and inflammable substances.

It belongs to chemistry to examine in what manner the gases, the acids, and the elementary earths, have acted in the formation of the non-organic substances which form the solid crust or surface of our globe, and of which we have just considered the external and internal forms. Mineralogy describes, defines, and classifies these substances; geology treats of their origin; but physical geography, the object of which is to investigate the structure, composition, and physical relations of the globe, cannot be accused of going beyond its limits, in tracing out a general view of the various substances of which the solid parts of the earth are formed.

These substances are either *simple*, that is, formed of the same chemical elements, and having for their nucleus the same integrant molecule; or *aggregate*, that is, composed of two or more simple substances. The first of these substances are minerals, the objects of the sciences of mineralogy and crystallography; the second are the rocks and earths, which belong to the province of geognosy.

We distinguish four classes in the mineral kingdom: the first comprehends saline or *acidiferous* substances, which are composed of an acid united to an earth or an alkali, and sometimes to both. The second contains the *earthy* substances, into the composition of which earths alone enter, or sometimes an earth united to an alkali; in the third class are placed all *inflammable* substances which are not metallic; substances hitherto imperfectly analyzed, but which may be distinguished by the property which they possess, of burning with decomposition, or of evaporating. The fourth class embraces the *metallic* substances known by their brilliancy, by their great specific gravity, and, in part, by their ductility and malleability.[a]

We shall now consider the mineral kingdom, in so far as it regards physical geography, that is, by examining the genera most abundant in nature, and the species most remarkable for their physical qualities. While we take the Terminology of M. Haüy for the basis, we shall compare it with that of other mineralogists.

The carbonate of lime, that is, lime combined with carbonic acid, is also called aerated lime, or calcareous spar. It is the most abundant of any known mineral substance on the earth. It belongs to every geological epoch, and to every soil. Among the ancient and primordial masses, it not only forms one of the constituent principles of rocks, but it also is seen in its pure state in immense beds or banks, the peculiar character of which is a laminated or scaly texture, which indicates a confused crystallization. It abounds still more in the secondary or stratified mountains and masses of earth, of which it forms more than the half. It is found also in the third order, combined with clay, and thus constitutes the various marls. It forms also vast beds in the state of chalk, frequently accompanied by large masses of calcareous shells compressed together, and broken, and which had once been inhabited by marine animals. We are therefore led to consider chalk as a very ancient chemical decomposition of the altered and obliterated remains of shell-fish.[b] It is well known that the madrepores and other polypi of the equatorial seas, form limestone continually in great quantities. The port of Bantam was shut up in less than a century by rocks of coral formed by polypi.[c] Limestone is found in the form of breccias and rolled pebbles, in alluvial soils, and also in volcanic soils, where it has been detected by the explosions that have taken place. There are, however, countries where limestone is not found, or where, at least, it has hitherto been but very rarely seen; as, for instance, in the neighbourhood of the Cape of Good Hope,[d] and in the granite and volcanic peninsula of Kamtchatka.[e]

The carbonate of lime confusedly crystallized, forms the ordinary building materials in France. When it possesses a finer grain, it forms a sort of marble of no great value.[f] According as it becomes harder, and, if we may so express it, more refined, it takes a much finer polish, and is better fitted for the chisel of the sculptor. It is then properly called marble. White statuary marble from Carrara in Italy, is esteemed the purest of any. The coloured marbles are formed of calcareous matter, mixed more or less with extraneous substances. Pliny is right when he says, "Every country possesses its peculiar species of marble." Marbles, however, become more rare, more regularly crystallized, of a larger grain, and more mixed with particles of pyrites, as you leave the middle of the temperate zone, and approach the pole.

Crystals of carbonated lime, under the name of calcareous spar, are found in almost every subterraneous cavity, and in all veins. They serve to ornament every cabinet of mineralogy. Filtering through the vaulted roofs of subterranean grottos, this substance forms those concretions known by the name of calcareous stalactites; the various positions and forms of which present all kinds of agreeable and fantastic appearances to the imagination of the spectator. The eagle-stone (*géode*) is a concretion, the interior of which is hollow, sometimes filled up with crystals, sometimes bristled with multitudes of needles. The more abundant and uniform calcareous concretion produces those masses known under the name of calcareous alabaster, which

[a] Haüy, Traité de Minéralogie. Brongniart, Traité Elem. de Minéralogie. Delamétherie, &c.

[b] Steffen's Memoir upon the Natural History of the Interior of the Globe, p. 26. (In German.)

[c] Blumenbach, Histoire Naturelle, p. 450. Comp. Forster, Péron, &c.

[d] Thunberg's Travels, i. 216. (In German.) Sparman's Travels, 142—618. (In German.)

[e] Georgi, Description Physique de la Russie, 1.

[f] "*Pierre de Liais*," calcareous freestone.—P.

differs from marble in being less pure, more variegated in its colours, and somewhat more transparent.

The incrustations which are formed by water, loaded with carbonate of lime, have led to the supposition that there are some petrifying springs. These incrustations preserve exactly the figure of the vegetables that have been covered with them, the substance of which has been destroyed. It is in the same manner that the tufas are formed, or calcareous sediments in canals, and the beds of rivers and lakes, the waters of which are charged with this substance.

Other species of lime are of less importance. Some varieties of phosphated and of fluated lime exhibit coloured crystals, which very much resemble the precious stones, such as chrysolites, emeralds, rubies, and others. Fluated lime is often found in the matter of metallic veins, mixed with the ore.[a]

Sulphated lime, or lime combined with sulphuric acid, is commonly called gypsum, or plaster-stone, when mixed with carbonated lime. When crystallized, it is called selenite. This stone is divisible into brilliant and transparent laminæ, and was used by the ancients instead of glass for windows. It very much resembles the foliated *mica*, or talc of Muscovy, yet is totally different in regard to the nature of its component parts. The compact sulphated lime, fine and close-grained, and of a beautiful white colour, is the substance which, under the name of gypseous alabaster, or alabastrite, (pseudo alabaster,) has so often afforded the poets a term of comparison to express the whiteness of the neck or arms: "A skin as alabaster pure." Sulphated lime is often found under the form of hills or little mountains, and sometimes in beds or strata, in countries of the second and third formation. It is doubtful whether there be any of the first formation, or whether the masses which are found among the primitive mountains, have not been produced by causes of a later origin.[b c] The school of Werner supports the first opinion. The north of Europe and of Asia furnishes very little sulphate of lime.[d]

Barytes and strontites are but of little importance in a physico-geographical point of view, although the sulphated variety of the latter affords those magnificent crystals which line the cavities in the beds of sulphur in the valleys of Noto and of Mazzara in Sicily. To what extent magnesia is concerned in the formation of certain rocks, is not yet sufficiently determined.[e] The sulphate of magnesia, known under the names of *sel amer* and Epsom salt, is found in many mineral waters, and in all the wells and fountains in the neighbourhood of Montpelier.[f] It is also found in a state of efflorescence upon the surface of schist, from which it can be easily collected.[g]

Nitrate of potass is composed of vegetable alkali or potass, nitric acid, and the water necessary for its crystallization. It is generally known under the name of saltpetre, or nitre. It is constantly formed in those places which, like our stables and cellars, contain animal and vegetable matters in a state of putrefaction, or which receive the effluvia of those substances. It is deposited upon the surface of old walls. As this article is much used in the manufacture of gunpowder and aquafortis, or nitric acid, they make artificial nitre beds by means of a mixture of vegetable and animal substances.[h]

Muriate of soda, or common salt, is composed of soda, muriatic acid, and water. It is spread throughout nature in an abundance corresponding to its extensive utility. When found in a crystallized state, it is called fossil, or rock-salt. There are immense masses of it in Poland, in Hungary,[i] in Austria, in Bavaria, in Hanover, in England, in Spain, and generally in all secondary countries. Great quantities of this salt are held in solution by the water of the ocean, from which it is procured by various processes. Sea water is sometimes evaporated in shallow ditches or pits by the action of the sun; sometimes in large vessels, by the aid of fire, and the salt procured from it has different degrees of sharpness and strength. Some lakes, rivers, and springs, contain salt, particularly in the neighbourhood of the Caspian sea, where even the soil is impregnated with it. Salt lakes are generally found near hills of marl, clay, limestone, and gypsum.[k]

The borate, or rather sub-borate of soda, or borax, is of great utility, especially in the melting and soldering of metals. This substance, the origin of which is disputed, is found as a native production in some lakes and cāverns in Thibet, Nepaul, Persia, Tartary, and in Saxony, but we also obtain it by a method similar to that employed for procuring nitre.[l m] Carbonate of soda, commonly called natron, is found in certain lakes in Egypt; in that of Kis-Maria in Hungary, and in those situated in the plains north of the Caspian. It sometimes covers the plains with a slight efflorescence.[n] The muriate of ammonia, commonly called sal ammoniac, comes from Egypt and Persia. It is also found in small quantities round the volcanos of Sicily and Italy. It is also made in several countries in Europe. Mixed with pounded ice, it produces an artificial cold, which, according to Macquer, reaches to 18 degrees below zero in Reaumur's thermometer.[o] All these salts seem more particularly to abound in plains, which are surrounded by mountains; and which must have been the basins of lakes that are now become dry, or partly run out. The great desert of Sahara appears to be a similar basin, co-

[a] This is particularly the case in the Derbyshire lead-mines, where it forms the *gangue* or matrix, and sometimes occupies entire veins in shell limestone. It is beautifully variegated in its colours, and is wrought into various utensils and ornaments. Its common appellation is *fluor-spar*, or Derbyshire spar.—P.

[b] Saussure, Voyage dans les Alpes, § 1208, 1226, 1239, 1931.

[c] Sulphate of lime undoubtedly constitutes one of the primitive rocks. It alternates with gneiss and mica-slate, and is there white and granular, like primitive limestone, imbeds mica, talc, &c. and is entirely without organic remains.—P.

[d] Georgi, Description Physique de la Russie, v. 126.

[e] Faujas Saint Fond, Géologie, ii. 298, *sqq.* Delemétherie, Theorie, v. p. 12.

[f] Sulphate of magnesia exists in considerable quantities in sea-water. It crystallizes, along with sulphate of soda, from the mother-water of salt pans.—P.

[g] Chaptal, cited by Haüy, Minéralogie, ii. 336.

[h] Nitre is found in great abundance in the calcareous caverns in Kentucky. It is found in the earth, on the floors of the caverns, from which it is extracted by lixiviation. It is also found there in a sand-stone richly impregnated with it, called the Nitre rock ore.—P.

[i] Fichtel, History of Rock-Salt. (In German.)

[k] Pallas, Voyag. passim. Georgi, Descript. de la Russie, v. 21. 59.

[l] Fourcroy, Elémens d'Histoire naturelle et de Chimie, tome ii. p. 68. Busching, Introduction à la Géographie, p. 120.

[m] This is said to be the case in Persia.—P.

[n] Voyages de Townson, de Pallas, etc.

[o] That is —8¾ or 40¼ below the freezing point, in the common or Fahrenheit's thermometer.

vered with saline efflorescence, while the country watered by the Niger is totally free from it. Brazil, in America, is destitute of salt, while Paraguay abounds with it. This salt is rare in Scandinavia, and in the north of Russia.

Alum, in recent chemical works, is called alkaline-sulphated alumina.[a] This substance is found by itself only in very small quantities; but it can be procured from certain earths and stones, which are impregnated with it, or from schists and pyrites, which contain only its principles.

Pure alumina,[b] which is procured from alum, is distinguished among the elementary earths by its tendency to mix and unite itself with water. It is found blended with the most dissimilar substances. It enters into the composition of common clay, and into that of oriental gems. We know that these stones are very difficult to melt.

A Danish missionary has brought from Greenland a substance, which has been called cryolite, and which melts like ice in the flame of a candle; it is the fluated alkaline alumina of Haüy.[c] These very opposite results from combinations, in which the same substance is predominant, ought to teach us, that in forming a true theory of the earth, we should employ with the utmost circumspection the principles and analysis which chemistry affords.

Let us now proceed to earthy substances. The first species which offers itself to our attention is that of hyaline quartz, or quartz properly so called. This has crystallized silex for its base, and comprehends some varieties very different in their aspect to the eye of the ignorant; but the severe method of modern mineralogy, established upon chemical analysis, rejects all false classifications founded upon external appearances.

When hyaline quartz[d] is found in round or angular grains, without cohesion, having a vitreous surface, it is esteemed of no value, being nothing but sand or gravel, and fit to be used only in the formation of roads: if these small grains are united by a natural cement, they form silicious sand-stone (*grès quartzeux.*) When the same substance has by natural friction been fashioned into small round masses, it is raised into the rank of crystalline flints (*cailloux cristallins.*) Lastly, when hyaline quartz, in consequence of a more regular crystallization, is of uniform density, and perfectly transparent, it occupies a distinguished place in the collections of amateurs under the name of rock crystal; it ornaments our lustres; is used even in some kinds of jewellery. In Madagascar, these crystals are found in the greatest purity, and in large tables or flat layers,[e] and this seems to confirm the truth of the reports mentioned by Herodotus and Pliny, of the abundance of crystal in Upper Ethiopia. When of a violet or purple colour, the rock crystal becomes amethyst, and is in this state highly valued and classed among the gems. When blue, it is the sapphire, (*saphir d'eau,*) which is not so precious: When it assumes the colour of rose, it is the ruby of Bohemia, the most valuable of all: when yellow it is the occidental topaz; in short, the crystals of this substance take the names of the different gems which they resemble in colour.

The species, quartz agate, of which concretionary silex constitutes the base, and of which many mineralogists still continue to form a distinct genus under the name of *silex*,[f] contains the following among other varieties; the chalcedony, which is of a bluish or gray colour, and of an imperfect and cloudy transparency; the carnelian, which is red, and of a cherry-like semi-transparency, and sometimes of a beautiful carnation hue; and lastly, the chrysoprase, a stone of a delicate and clear green. They give the name of onyx to agates formed of two translucid stripes of different colours. Oriental agate is distinguished by the fineness of its composition, and by the peculiar appearance given to its interior by its various undulated laminæ.

When the quartz agate is less fine in its composition, it is used for gun-flints and for mill-stones, and even for common flints. The enhydros, celebrated by Pliny, is only an eagle stone, of quartz agate, containing a small quantity of water, which is perceptible through the semi-transparency of the stone. There is a variety of quartz, which floats upon the water until it has imbibed a certain quantity.

The noble or perfect opal, as it is termed, is a milky resinous quartz, exhibiting a beautiful play of colours, like those in the rainbow, and varying their shades according to the position. It is highly prized on account of this brilliant appearance, which, however, arises solely from imperfections, that is, very minute cracks or fissures with which it is filled. When divided, it no longer displays this pleasing and changeable effulgence.[g] The hydrophane, or semi-opal, becomes of a beautiful transparency, when plunged in water.

Jasper is a quartz agate, blended with argil or clay, and a little iron, which gives it a variety of colours. It was formerly confounded with porphyry; but, it is now ascertained that jasper is of a secondary formation, and has nothing in common with the primitive rocks of porphyry. In general quartz agates belong to the secondary earths. The beds of silex, properly so called, namely, gun-flints, mill-stones, and common flint-stones, though inconsiderable in regard to the whole globe, present, in respect of their situation, some remarkable peculiarities. Strata of silex very often alternate with those of chalk. Hence some naturalists have thought that they were the petrified remains of certain marine animals.[h] In several vast regions of the globe, as, for example, Siberia, and the plains in the neighbourhood of the Caspian sea, gun-flints or "silex pyromaque"[i] is very seldom found.

Hyaline quartz, without ever forming the entire substance of any mountain, abounds in every soil. It is one of the integral parts of most varieties of the granite

[a] Sulphate of alumine and potash. Alumine 10.50, potash 10.40, in 100.—P.

[b] It is called Alumina, from its being the base of the salt called alum, and sometimes argil, because it is also the base of the clays.—T.

[c] Fluate of alumine and soda. Alumine 24, soda 36, in 100.—P.

[d] Haüy, ii. 407, *sqq.*

[e] Rochon, Recueil de Mém. sur la Physique, 155.

[f] Comp. Haüy, ii. 439. Bergmann, Sciagraphia, i. 325. Delamétherie, Théorie de la Terre, ii. 136.

[g] See Newton, Optice Lucis, l. ii. p. 2. and the Minéralogie of Haüy, ii. p. 456.

[h] Delamétherie, Théorie de la Terre, v. 33.

[i] Georgi, Description de la Russie, iii. 169.

rocks. It also enters, in the form of crystallized grains, into the composition of many rocks of porphyry. It forms the base of a great number of fossil micaceous rocks. Its crystals occupy the fortuitous cavities which are found in almost all the large masses of rocks. They ornament the walls or sides of such cavities, sometimes in transparent prisms of nearly a foot in diameter. Hyaline quartz forms veins, frequently of a great extent, which pass through the primitive mountains; and these veins, becoming exposed, and projecting by the wearing away of the rocks in which they were imbedded, have given rise to the opinion, that there existed mountains entirely composed of quartz. There is scarcely any secondary rock, in which we do not find common or unshapen quartz, in masses, in veins, or in crystals.[a]

Arenaceous quartz, (*quartz arénacé,*) or quartz in the form of sand, covers almost entirely the bottom of the sea. It is spread over the banks of rivers, and forms vast plains, even at a very considerable elevation above the level of the sea, as the desert of Sahara in Africa, of Kobi in Asia, and many others. This quartz is produced, at least in part, from the disintegration of the primitive granite rocks. The currents of water carry it along, and when it is in very small, light, and rounded grains, even the wind transports it from one place to another. The hills thus are made to move like the waves, and a deluge of sand frequently inundates the neighbouring country.[b]

Arenaceous quartz furnishes, by fusion, one of the most useful substances we have, namely, glass, which, being less hard than the crystals of quartz, can be made equally transparent, and is equally serviceable to our wants and to our pleasures. There it shines in walls of crystal in the palaces of the great, reflecting the charms of a hundred assembled beauties; here, in the hand of the philosopher, it discovers to us the worlds that revolve above us in the immensity of space, and the no less astonishing wonders that we tread beneath our feet.

We shall now shortly notice the different species of precious stones, which are almost all composed of alumine, or pure argil, as the analyses of Bergmann and Klaproth have proved. According to the method of Haüy, the name of *Corundum* now comprehends a species, the red variety of which is the true oriental ruby;[c] the blue, the oriental sapphire; and, the yellow, the oriental topaz. These three varieties are comprehended by the French amateurs under the general name of "oriental gems." These valuable and brilliant substances consist of ninety-eight parts of alumina, and two of iron. To the species called by the French *Spinelle*, the colouring matter of which is the metal called chrome, belong the scarlet or light red ruby,[d] the pale rose or pink ruby,[e] the variety, called *rubacelle*, of a yellowish red colour: all these are less hard, and have less play or brilliancy than the corundums. The limpid and transparent topazes of Siberia, the pale yellow ones of Saxony, those of Brazil, the colour of which is a reddish yellow, are all included by Haüy in the same class. The ruby of Brazil is only a red topaz, (sometimes reddened by means of fire;) the beryl or oriental *aigue marine*, called the sapphire of Brazil, is a greenish blue topaz. Many chrysolites belong to the same species The beautiful emerald of Peru, the pure green of which is more pleasant to the eye than the dazzling brilliancy of many other more perfect gems; and the occidental or common beryl, a stone of but little value, have both the same bases, namely, silex, alumina, glucine, and lime; but the colouring principle in the emerald is chrome, and, in the beryl, a very small quantity of iron. The garnets of Bohemia, of a deep bright red, and those of Syria, of a purple violet colour, contain a large proportion of iron, sometimes one-third, or even two-fifths: the oriental garnet is very magnetic. It is a singular circumstance, that this quantity of iron does not injure its transparency.[f] The *cymophane*, known also by the names of chrysoberyl, and oriental chrysolite, is of a yellowish green colour, and is nearly as hard and heavy as the corundum.

We have not yet spoken of the diamond, that king of gems. The reason is, that this king is now dethroned. Modern chemistry has proved, by multiplied and decisive experiments, that the diamond, far from resisting the fire, like all true gems, is entirely dissipated, without leaving any residuum whatsoever. Consequently, the diamond is now classed among the combustible substances, along with sulphur, amber, and coal. It appears that the diamond consists of pure carbon. Like all the other fine gems, the diamond seems to abound most in the East Indies, and in South America. The precious metals also more peculiarly belong to the equatorial regions.

Passing over some less interesting species, we come to feldspar, a substance composed principally of silex and alumina, with small proportions of lime and potash. If it be coloured, it is by the presence of oxide of iron. It cuts glass, is phosphoric, and emits sparks when struck with steel. Feldspar forms the base of a multitude of rocks, and predominates in those of primitive formation, constituting at least two-thirds of the substance of granite.[g] Extensive mountains are sometimes solely composed of it. Guldenstedt tells us, that feldspar, either pure, or mixed with granulated quartz, forms that vast plain of rocks, which extends from both sides of the cataracts of the Dnieper. The fosses of the fort of Sacharowa, are cut out of natural feldspar.[h i] It is also to this substance that porphyry rocks owe the distinct spots which arise out of their general colour; but these rocks rarely present it under regular forms. The fine crystals of feldspar, whether opaque and coloured, or limpid and transparent, occupy veins or cavities, contained in the primitive mountains; and it is the Lombard Alps which have furnished what the cabinets of France consider the most perfect specimens of this kind. But the most beautiful crystals of feldspar, which join to a fine green colour a great degree of transparency, are found in detached blocks or masses in the steppes of the Kirguis,

[a] Brongniart, ii. 271—279.

[b] So where our wide Numidian wastes extend,
Sudden the impetuous hurricanes descend, &c.
See *Addison's Cato.*

[c] Lapidaries call all perfect gems oriental, and those which are less so occidental.

[d] Spinelle Ruby.

[e] Balass Ruby.

[f] Haüy, ii. 551.

[g] Dolomieu, quoted by Haüy, ii. 608.

[h] Georgi, Russie, iii. 179.

[i] "*Felspath vif;*" compact massive Feldspar —P.

whence the Bucharians carry them to Semipalatnoi.[a] It is the mountains of Siberia, towards the lake Baïkal, which have supplied those large plates of azure feldspar, with which the palace of Czarskoselo is adorned. It appears then that this substance abounds still more in the Alps of Asia than in those of Europe. On the contrary, America does not appear to afford it in large quantities.[b]

Feldspar, even when decomposed, still maintains a character of importance. It is found in extensive beds, from the Uralian mountains to Kamtchatka. Of the two substances which the Chinese use in the making of porcelain, the one named *petunzé*, is a whitish laminated feldspar; the other called *kaolin*, is an argiliform feldspar, that is to say, feldspar which has passed by decomposition, from the state of a stone, to that of a very brittle clay, without cohesion, combining with water, of a fine white colour, and infusible by itself—the *petunzé* acting as a flux. The same substances are employed in Europe in the manufacture of porcelain ware.[c]

The name of *petrosilex*[d] has been given to several substances, very widely distributed in nature; but there appears to exist great confusion in this subdivision of the mineral kingdom. The hornstone of Werner or keratolithe of Delamétherie, and the secondary petrosilex, or *néopètre* of Saussure, appear to be one and the same substance,[e] belonging to the coarser *quartz agates*, and to the secondary rocks; but the true petrosilex, compact and semi-translucent, which is found in Sweden,[f] in Norway, in Switzerland, and in general in all the primitive rocks, appears to resemble feldspar.[g] This stone forms of itself very considerable mountains, as well in the Alps as in the Uralian chain. In France it is found sparingly in detached blocks and rolled pebbles.

Amphibole, though less common than feldspar, holds a no less distinguished rank among the substances which compose the primitive rocks. It predominates in greenstone; it forms with feldspar the primitive trapps, which differ from basalt; and enters into the composition of sienite, a stone often nearly allied to granite. It also forms of itself very considerable masses. The crystals of European amphibole are most frequently met with incased in substances ejected by volcanos. In Siberia, the traveller Laxman, found, near the lake of Baïkal, amphibole crystallized in small prismatic columns, with four large faces, and three small ones. It was hence called baïkalite.[h]

Mica, a substance remarkable for its metallic brilliancy, is distinguished from talc by its simply smooth surface, and by not being like talc unctuous to the touch. The variety of mica which consists of large thin transparent laminæ, is mistermed talc of Muscovy. It is also known under the Latin name of *Glacies Mariæ*. The Russians, especially in Siberia, use it in their windows instead of glass;[i] but it soon becomes soiled, and, in some measure loses its transparency by exposure to the air. Another variety of mica in spangles of a yellowish gold, or whitish silver colour, is known all over the world, by the ridiculous names of cat's gold, or cat's silver. The gilt sand, and gold powder, which the paper-makers use for purposes of ornament, are only mica in small fragments.

Mica, says Dolomieu,[k] belongs essentially to the primordial rocks, where it has originated in the midst of the confused crystallization by which these rocks have been formed. That which is imbedded in certain stony substances, of secondary formation, has been conveyed thither after the destruction of the rocks which enclosed it; and so much the more easily, as its particles, thin and light, were susceptible of being carried along by the waters, which deposited them with other sediments of an analogous nature. The remains of mica, are also found (having been carried thither) in the strata of sandstone (*grès*) and schist, which generally alternate with beds of coal. Its fragments are often disseminated in the sands of the most recent epoch; thus it exists in different states in substances of every formation. It appears that, in the south of Europe, so well explored by Dolomieu, mica is rarely found crystallized by itself; that in rocks it does not form laminæ of any sensible extent, and that, even in veins, its plates are only some inches in dimensions; but all accounts agree in asserting that it is found in Russia, Siberia, and Songoria, in laminæ, and in masses, sometimes more than two ells square. It is in the granite mountains near the rivers of Mama and Aldon that the mica is worked. It is found in detached masses,[l] and it sometimes appears on the surface of the earth, but is oftener covered with a bed of talc.[m] Near the lake Baïkal, and in the Uralian mountains, we meet with masses composed of rhomboidal and hexagonal laminæ of transparent mica in the midst of granite. It is an undoubted phenomenon in physical geography, that the most abundant crystallization of mica is in the northern regions.

Talc,[n] which differs from mica by the greasiness of its surface, is also less hard; it does not even mark the carbonate of lime; it is easily scraped with a knife. On the other hand, it differs from soapy clay, because it forms no paste with water, and does not adhere to the tongue. The talc of Venice, which abounds in the Tyrol and Valteline, is of a greenish white, silvery, and divisible into thin, transparent, and flexible plates; it furnishes a powder which renders the skin smooth, and is employed as a cosmetic. The scaly talc is known under the name of chalk of Briançon. *Steatite*, or Rock Soap,[o] is the

[a] Pallas, Nouv. Mémoires du Nord, v. 309. Bindheim, Analyse, etc. dans les Mémoires des Naturalistes de Berlin, vol. xi.

[b] Feldspar is one of the commonest minerals in the primitive districts of N. America. Most of its varieties are found there; and the common variety frequently occurs in large laminated masses in granite. The opalescent variety, or Labrador Feldspar, remarkable for its play of colours, was first found on the coast of Labrador.—P.

[c] These two substances are only feldspar, more or less decomposed. Kaolin is supposed to be formed in most cases, by the decomposition of graphic granite, which consists almost entirely of quartz and feldspar. The feldspar, in the coarser grained granites, occupying veins ingneiss, mica-slate, &c., very readily decomposes by exposure to the air.—P.

[d] Petrosilex, a Latin word, which corresponds to the words, *felshicsel* in German; *berg-flint* in Danish, *helle-flinta* in Swedish: all these words mean rock-flint.

[e] Voyages, § 1194.

[f] Wallerius, Système Minéral, vol. i. p. 283. (Petrosilex æquabilis, Spec. 122.)

[g] Haüy, iv. 385. Delamétherie, ii. 203.

[h] Severgin, Nov. Act. Petropol. 1791 p. 307. Crell, Ann. Chim. 1793 ii. 21.

[i] Patrin, Hist. Nat. des Minéraux, vol. i. p. 71.

[k] Haüy, Minéralogie, iii. 214.

[l] "Nids," nests.

[m] Gmelin, in Georgi, iii. 238.

[n] Talc, a stone greasy to the touch and sight; from talg, *fat*, in Danish, Swedish, German.

[o] Soap stone.

graphic talc of Haüy. It is the substance of which those little figures that are brought from China are formed, and whose grotesque appearance has caused them to be called *Magots*, in allusion to a species of monkey which bears that name. The "talc ollaire,"[a] which is easily turned on the wheel, is made into pots.

This substance belongs equally to the primitive and secondary rocks, but it is less common in the latter. According to Dolomieu, it sometimes arises from the decomposition of serpentine rocks, and it then occupies cavities where the products of the decomposition are collected. Dolomieu, however, considers the talc as formed a long time after the granite rocks. It indeed is disposed in very extensive beds, but then it is neither pure nor homogeneous. The purest talc is found in detached nodules imbedded in micaceous rocks. *Chlorite*[b] seems sometimes to have penetrated by filtration into the veins of primitive rocks; it is coloured by iron. In Corsica, and near the White Sea,[c] we find a foliated sort, which is penetrated throughout with little sparkling crystals of iron. The green earth of Verona, which is used in painting, is a variety of chlorite talc; it is contained in beds of compact lava, into the cavities of which it has been introduced by filtration.

We shall be obliged to pass rapidly over many interesting species, such as the tourmaline or the electric schorl, which is remarkable for its very strong electricity in its two opposite points; when heated, it attracts or repels light bodies, such as ashes;[d]—the lazulite, or sapphire of the ancients,[e] which furnishes the superb paint called Ultramarine, the permanency of which, by the side of the other colours, which are more or less affected and altered by the action of the air, somewhat impairs that harmony of tints which is so pleasing in pictures;—a number of stones, to which the name of zeolite has successively been given; *jade*, or nephrite, which resembles talc; *idocrase*, otherwise vesuvian; the *amphigene* of Haüy, otherwise the leucite or white garnet; the *emeraudine*, (*dioptaze* of Haüy,) which, by its beautiful green colour, derived from copper,[f] resembles the emerald; and a number of others, which it were tedious to enumerate. We will terminate this hasty survey of earthy substances by a brief description of the celebrated asbestos.

This substance, called also amianthus, appears to be produced from the decomposition of primitive rocks, among which it is oftenest found. It chiefly occupies fissures and cavities of steatitic rocks, serpentine, and others abounding in magnesia. The asbestos which is found in the mountains of Tarantaise, in Savoy, forms silky filaments of more than three decimetres, or about a foot in length. People, when they see, for the first time, a detached tuft of asbestos, can scarcely be convinced that it is actually a stone, and not a species of fine white silk. Asbestos abounds in Corsica; Dolomieu made use of it, instead of hay and tow, to pack up other minerals. Ciampini says, that the longest asbestos he ever saw came from the Pyrenees.[g] It abounds in the Uralian mountains, and in Greenland. In Corsica, they mix asbestos with the clay used in the potteries, which is thus rendered less brittle, and more capable of resisting the sudden alterations of heat and cold. The ancients spun the asbestos, and made towels, napkins, and head dresses of it. When these became soiled by use, they were thrown into the fire, which did not destroy the substance of the asbestos, and upon being taken out, were found to be whiter than if they had been washed. In the funeral obsequies of kings and emperors, the dead body was enveloped with cloths of asbestos, before it was placed on the funeral pile; and thus the ashes were obtained quite unmixed.[h] In modern times, the Russians alone have attempted, with success, to spin the asbestos. The inhabitants of the Uralian mountains have still preserved some remains of this frivolous industry.[i] The indestructible paper, made from this substance, appears more useful. Wicks for lamps are also formed of asbestos, which easily imbibe oil, and burn with a brilliant flame.[k] Father Kircher made use of such a wick for more than two years, without any perceptible decay, but, having lost it by accident, was prevented from continuing his experiment. Perhaps the fabulous accounts of unextinguishable sepulchral lamps derive their origin from this circumstance.

Of the inflammable substances, sulphur naturally presents itself first to our observation. That which is crystallized by the action of a liquid, is found in veins or in beds, among sulphate of lime, or among potters clay. These beds, which are often very extensive, border upon strata of rock salt. Crystals of sulphur sometimes adorn the interior of calcareous, or even quartz eagle-stones. With respect to sulphur formed by sublimation, it is found in powder, in striated masses, or even in crystals, at the mouth of many volcanos, such as Etna, Vesuvius, and Mount Hecla. Sulphur is also obtained from the putrefaction of animal matter. Several substances, among others the sulphurous pyrites, are impregnated with sulphur. We cannot doubt that sulphurous and sulphuric acid exerted a powerful agency in the primitive fermentation of the elements—but there is nothing in the existing economy of nature which can enable us to penetrate these mysteries of "chaos and ancient night."

We have already spoken of the diamond, to which the rigid justice of modern chemistry assigns a place among combustible substances. Anthracite, a substance similar to pit coal, combined with stony matter, of difficult combustion, appears to have the same principle for its basis as the diamond, namely, pure carbon, accidentally mixed with flint and iron. Anthracite occurs chiefly, but not exclusively,[l] in primitive rocks, where it forms considerable masses. Thus, as Dolomieu observes,[m] "carbon, or the carbonaceous principle, exists in nature,

[a] Potstone.
[b] *Talc chlorite*, Haüy.
[c] Laxman, in Georgi, iii. 214.
[d] Minéralogie de Haüy, iii. pages 44—58.
[e] Bayer, dissert. de Sapphiro. Beckmann, Histoire des Inventions, iii. 182. *sqq.*
[f] It contains 28.57 oxyd of copper, in 100. (*Copper Emerald*, Werser.)—P.
[g] De Lino Incombustibili; Romæ, in 4to. 1691, p. 5, 6.
[h] Pliny, Nat. Hist. b. 19. ch. 1.
[i] Bruckmann, Magnalia Dei in locis subterr. ii. 955. Georgi, iii. 244.
[k] Egede, Account of Greenland, (in Danish.)
[l] Hericart de Thury; quoted by Brongniart, Tr. de Minéral. ii. 58
[m] Journal des Mines, No. 29. p. 338, 339.

independently of animals and vegetables, of which there are no traces found in the primitive soils." Let us also add, that sulphur must have existed before organized bodies, since, as Delamétherie observes, it is found in granite.[a] Deluc has lately expressed the same opinion in relation to primitive calcareous earth.[b] We seem every day becoming more disposed to admit the formal pre-existence of all the elements which enter into the composition of the globe, whilst false logic would represent them as being wholly the remains of animals or vegetables. Let us rather say, that the organic energy of nature exerted in two different directions, has given rise on one side to calcareous rocks, alkaline-earthy substances, and animals—on the other, to quartzeous and bituminous substances, and vegetables; constantly putting in action the same elements, or their products, but always proceeding from a general and imperfect organization, to another more individual and more perfect, ascending from the stone to the diamond, from molybdena to gold, from the medusa to the shell, and from the polypus to man.[c]

The elementary oils existed also without doubt before vegetable substances. The place they hold in nature is worthy of our attention.

Bitumen, in a liquid state, when it is of a brownish colour, commonly bears the name of petroleum, or mineral tar, and when it is white and transparent, that of naphtha. It filters through the earth and rocks which remain impregnated with it. There are springs of it; those of Baku in Persia are well known. It floats sometimes like oil upon the surface of the waters. It is said that there is a lake of this description in Mesopotamia. In the duchy of Parma, it is drawn up in buckets from wells sunk in the earth for the purpose. The same substance, in drying, passes to a state of glutinous bitumen, named also *maltha*, mineral pitch, or *pissasphaltum*, and from that to solid pitch—in this last state it is called *asphaltum*, and gives its name to lake *Asphaltites* in Palestine. It appears that a subterraneous fermentation detaches from a bed of solid bitumen, situated under the lake, those crusts of asphaltum that we see swimming on its surface. The glutinous bitumen is found in France, in Auvergne, at a place called the Puy de la Pége,[d] where it covers the earth, and sticks to the feet, so as to incommode and retard the traveller. In Persia, Japan, and other countries, they use liquid bitumen as oil for their lamps. The Persians and Turks mix it with their varnish to give it lustre. The walls of Babylon were built with a cement in which bitumen formed an ingredient. Rouille has concluded, from his experiments upon mummies, that the Egyptians employed bitumen in their embalming.

Pit-coal appears to be bitumen united to an earthy base. Most naturalists consider pit-coal, (and the same may be said of other bituminous substances,) as being in a great measure a product of the vegetable and animal kingdoms. Such an origin appears at first marked out by the numerous remains of organic bodies, particularly of well known sea animals, which are found in coal mines;[e] by the impression of different plants, particularly of the fern tribe, in the schistous clays, which form the roof of these mines; and, finally, by wood, still partly in a ligneous state and partly bituminated, so that we can, from such appearances trace, as it were, the process followed in the formation of coal, from one point in the scale to another.

Chemical analysis proves that pit-coal gives the same products as organized bodies, namely, hydrogen, oxygen, carbon, azote, and an earthy residue.

Coal is most commonly found in France and in England, where the primitive and secondary rocks join; whence it has been concluded, that beds of coal were collections of substances deposited by the ancient sea along the shores of the ancient earth—it is supposed that the rivers would bear along trees, plants, and bodies of animals towards the sea, which would throw them back upon its primitive shores, where they would accumulate in beds and masses, and in that condition enter into a state of decomposition and combustion. The mines of coal ought then to be found disposed around the most elevated *nuclei* of the new, or actually existing earth, and which have been the islands of the primeval ocean. Such is, among others, the disposition of the mines of coal around the mountains of Hartz, as described by Lehmann.[f]

But the simplicity of this theory does not account for the complicated circumstances connected with the position of coal. The numerous beds of sand-stone (*grès*,) schist, and limestone, which generally separate those of coal,[g] show us that this last substance has been formed at different intervals in a fluid, and perhaps in part, at a period when the present vegetables and animals did not exist. In some places, according to Delamétherie, the intermediate beds which separate the strata of coal, preserve, as well as these strata, a constant parallelism between them. This parallelism is so much the more remarkable, that there are beds of coal, which are scarcely an inch in thickness, although often several leagues in extent. It has been concluded, and with sufficient probability, that these beds were formed in interior lakes, and crystallized in calm waters.[h] It must at the same time be stated, that we observe other beds of coal which indicate circumstances of great confusion. Near Valenciennes, some beds, which are vertical, or almost vertical, are covered over by an alternate superposition with beds parallel to the horizon.[i]

The great extent of beds of coal presents another subject worthy of consideration; they appear to pass under the very bottom of the sea.

In the Danish island of Bornholm, which is composed of calcareous and schistous rocks, of a secondary formation, we find a considerable bed of coal, which comes

[a] Théorie de la Terre, ii. p. 250.
[b] Journal de Phys. 1803.
[c] The opinion advanced in the text, is altogether too visionary to meet the sanction of the man of science. Life and organization are confined to animals and vegetables, and as far as we know at present, are entirely distinct from the molecular attractions and the crystalline forms of minerals.—P.
[d] Lêmery, Dictionn. p. 602. The name of *La Pege* comes without doubt from the Latin *pix*, *picis*, la *poix*, pitch.
[e] It is doubtful if a single marine animal has been found in the coal formation. The few shells found there, are lacustrine or terrestrial.—P.
[f] Desmarets, Nouv. Encyclop. Géog. Phys. art. *Rouelle*.
[g] Duhamel, Extrait d'un Mémoire, &c. Journal des Mines, viii. 33.
[h] Delamétherie, Théorie de la Terre, v. p. 39.
[i] Baillet, inspector of mines, quoted by Haüy, Minéral. iii. 320

from the Baltic sea, passes under the island, and extends itself again under the sea, towards the opposite coasts of Scania, a province of Sweden. This bed, the thickness of which is not known, may be from five to seven leagues in length, and more than one league in breadth.[a] We may conclude, according to the apparent direction of the bed, that it ought equally to be extended under the secondary schistous rocks in Scania, which run from south-east to north-west, in the same direction as the bed of submarine coal. In fact, aluminous schist was first found at Andrarum, and a bed of coal has been recently discovered at Hoganess, upon the borders of the Sound, or entrance of the Baltic.

In short, it is a very remarkable thing, that coal, a substance so easily inflammable, is found covered over with substances, which, if they are not the products of volcanos, seem at least to owe their origin to fusion, occasioned by the powerful action of caloric. The most striking example of this collocation of the seams of coal has not yet been examined with due care. The islands of Feroe, which appear to be nothing but masses of basalt, and which rise perpendicularly from the bosom of the sea to the height of 1800 feet, contain an extensive mine of coal, inclining to the variety named "dry coal."[b c] It is found in the island of Sudoroe, and, according to the descriptions given of it, it seems to have at once, for its roof, its wall, and its support, basalt, trapp, or rocks which are closely connected with these two kinds.[d]

All bituminous substances exercise in a singular manner the ingenuity of the naturalist, who, though he can discover the elements of which they are composed, cannot explain their origin.

Jet is found so differently described, that we cannot say whether it is fossil wood, or hardened asphaltum.[e] The elastic bitumen, which occurs in England, near Castleton in Derbyshire, appears, according to the researches of two distinguished naturalists,[f] to be a substance identified with the *cahoutchuc*, or elastic gum, which certain trees in Peru furnish. This fossil cahoutchuc transported to so great a distance from the warm climate in which it must have been produced, seems then to furnish a new proof of the astonishing revolutions which our globe has undergone. The state of hardness, however, in which certain portions of this bitumen are found, renders the nature of it very uncertain.[g]

The most celebrated of all the bituminous substances, is assuredly *Succinum*, or yellow amber. We have seen what a prominent part the Succine islands, or the *Electrides*, formed in the history of the ancient geographical traditions, and that we may with equal probability, seek for this country of yellow amber in the Asturias, where that substance abounds in the beds of coal;[h] and in Eastern Prussia, where the Baltic Sea throws pieces of it upon the coasts, and where formerly the fishermen collected lumps of it in their nets,[i] whilst now it is the regular working of the hills of sand in the neighbourhood of the sea, which furnishes the greatest quantity.[k] There was lately found at Schleppacken, at the distance of twelve German miles from the sea, the largest piece of amber that was ever known; it weighs 13½ pounds, and is preserved in the royal museum of Berlin.[l] Next to Prussia, Eastern Pomerania furnishes the greatest quantity of amber: where it is also worked in quarries.[m] In general, the whole of the plain which borders the Baltic Sea on the south, produces amber commonly in beds of sand, and of clay, sometimes in the midst of imperfect coal.[n o] These depôts of amber extend from Livonia, and particularly from Courland, to the western coasts of Sleswick, where perhaps the Phœnicians purchased this substance formerly so much sought after.[p]

The situations in which yellow amber occurs; the physical and chemical qualities of this substance, which appears to approach the resinous gums; the insects which are found enclosed within it, as in a crystal prison; every thing, in short, connected with its history, would induce us to regard this fossil as a juice which once flowed from a tree, and which, buried in the earth by some natural convulsion, would be impregnated with mineral vapours, and acquire a certain degree of consistency.[q] But as the copal, the only kind of known gum which resembles amber, is brought to us from Africa and the East Indies, it would appear, that the forests in which amber is produced, could not exist in the environs of the Baltic, unless a very elevated temperature prevailed. Thus, these small fragile crystals, which at first seem to be only an object of idle curiosity, become so many monuments of the revolutions which our planet has experienced.

[a] Memoirs of the Society of Rural Economy of Copenhagen, (in Danish.) i. p. 455—496.

[b] See Charbon.

[c] Lignite.—P.

[d] Mémoires de la Société d'Histoire Naturelle de Copenhague. See article *Feroe*, vol. vi.

[e] Jet is arranged by Brongniart with the Lignites.—P.

[f] Delamétherie, Journal de Physique, xxxi. p. 311; Faujas Saint-Fond, Annales du Muséum d'Histoire Naturelle, 1, 261 *sqq.*; Mawe, Mineralogy of Derbyshire, viii. 80.

[g] Mineral Carbon has been arranged under several divisions, distinguished by their composition, and their geological relations. Carbon, pure or nearly so, includes the diamond and plumbago, found in the primitive rocks only. Anthracite is nearly pure carbon, but is found in the transition rocks, and is connected with organic remains, particularly of vegetables. It is also found in older rocks, without organic remains, but, in such cases, approaches plumbago. All these substances, when burnt, simply give out carbonic acid. Bituminous coal consists of carbon combined with bitumen. By distillation, it gives over naphtha and carburetted hydrogen. It is the proper caking coal, and is the kind generally employed as fuel, and the only one for the preparation of gas-lights. It is the only kind found in the proper coal formation, below the new red sand-stone. It is always connected with vegetable remains. Lignite has a much nearer resemblance to wood, both in texture and composition. It yields by distillation, pyroligneous acid. It is found in the more recent formations, above the new red sand-stone. It is of little comparative value for fuel. It includes jet, cologne earth, &c. It is connected with various organic remains, particularly with carbonated or bituminous wood. It passes upward, in the most recent formations, into Peat.—P.

[h] D. Casal, Histoire Médicale des Asturies, dans les Annales des Voyages, viii. 80.

[i] Boet. De Lapid. et Gemmis, l. ii. p. 159. Hartmann, Succini Prussici Historia Physica, etc.; Francfort, 1677, etc.

[k] Hasse, la Prusse, le pays d'ambre jaune et le paradis; Kœnigsberg, 1799.

[l] Kant, Géographie Physique, vii. 154, (supplement.)

[m] Brennus, Journal Littéraire de Berlin, Janvier 1802, p. 13. Téor. p 141. Ruhs, Mémoires de Poméranie, l. cah. iv. p. 399.

[n] Seetzen, Magasin minéralog. de M. Hoff, 1. vol., 4e cahier, p. 406.

[o] Lignite. It is found in a similar situation, associated with lignite, in many localities in the great tertiary basin along the shores of the southern states, particularly at Cape Sable, Maryland.—P.

[p] Heinze, Nouveau Magasin de Kiel, ii. 337 *sqq.* (d'après les Mémoires de l'Académie des Sciences de Copenhague.)

[q] Fourcroy, Elémens d'Histoire Naturelle et de Chimie (édit. de 1789) iii. 443.

BOOK X.

Continuation of the Theory of Geography. Of the simple substances which compose the solid part of the globe. Section Second: of Metals.

The only minerals which remain for us to consider, are metals; substances whose brightness, weight, density, ductility, and fusibility, engage the attention of mineralogists and crystallographers; substances which, forming sometimes the representative signs of the products of industry, and sometimes the useful or the formidable instruments of our arts, and our passions, ought to be carefully noticed in the description of political states; but they peculiarly deserve attention in the details of physical geography, from the intimate relation which they bear to two great agents of nature, electricity and magnetism. Our knowledge of facts is too limited for enabling us to discuss with advantage the bold hypotheses of some Danish and German naturalists, who pretend to form from analogical conjectures a theory of the electrical and magnetic phenomena observed in metals, and who have even ventured to draw from it the conclusion, that the solid centre of the globe was a metallic mass, of which all mineral substances whatever were only oxides.[a] This theory, unsatisfactory and defective, notwithstanding of all the attempts to support it by vague analogies, acquires, indeed, some interest, from its approximating to the results of Sir H. Davy's new experiments, which seem to indicate the metallic nature of a number of substances in appearance earthy and alkaline. We must wait the ulterior progress of these interesting researches, before we can apply them to explain the theory of the earth. But all philosophers should agree in considering the bearings and position of metals, as a subject worthy our most careful and persevering researches. Physical geography indispensably requires that a subject of this nature should constitute one of its departments; and if we devote to it a certain portion of our pages, our readers will perceive, in the progress of our work, the advantages which are thus afforded us, even in the study of political geography. We shall class metals according to their specific gravity.[b]

Platina remained unknown, or neglected, until 1735. Don Ulloa, a Spanish geometrician, who accompanied Condamine and Bouguer, in their voyage, to measure a degree at Peru, having found this metal there, announced the discovery of it in the relation of his voyage. Platina as yet has been found only in the gold mines of America,[c] particularly in those of Santa Fé, near Carthagena, in Castille d'Or, and in the mines of Choco, in Peru.[d] It is brought to us in little grains, mixed with gold dust, ferruginous sand, and some particles of mercury. That which has been brought into Europe, contains three or four extraneous minerals.[e f] It is the least fusible of all the metals.

To melt it into ingots, it is mixed with arsenic, a substance which renders the platina very fusible, and from which it is afterwards easily separated by roasting. But this process exposes the workmen to vapours, the danger of which is unfortunately too well known. It is of platina that those rods are made, that have been employed in measuring the base of the chain of triangles, whence has been deduced the length of the arc of the meridian which traverses France, and by consequence, the distance from the equator to the northern pole.

This metal has been chosen for such purposes, because it is little susceptible of dilating, or contracting from the variations of temperature. Its dilatation, according to Borda, is only $\frac{1}{11\,5\,0\,0\,0}$ for one degree of the centigrade thermometer, or $\frac{1}{9\,2\,0\,0\,0}$ for a degree of Reaumur; whilst a rod of iron dilates $\frac{1}{9\,1\,7\,5\,0}$ for a centesimal degree, and $\frac{1}{7\,5\,0\,0\,0}$ for a degree of Reaumur.[g]

Gold is only found in its native state, that is to say, almost pure. It exists in all kinds of earth. It is found in little beds in the primitive mountains of gneiss, and of micaceous schist, in the country of Salzbourg, and in Carniola; it occupies veins in the mountains of sienite and porphyry near Kremnitz in Hungary, in the secondary rocks of argillaceous-quartzous schist, or even of sand-stone, (*grès*,) at Zalatna in Transylvania, and in an argillaceous free-stone, (*grès argileux*[h]) not far from Ekaterinbourg in Siberia; thus, says Werner,[i] this metal has been formed in very different periods. It is also proved by the experiments of Sage, Berthollet, Rouelle, Darcet, and Deyeux,[k] that there are particles of gold existing in vegetables. Berthollet has extracted about

[a] Steffens, Histoire Intérieure de la Nature. Schelling, Théorie de l'Univers. Id. Journal de Physique Spéculative, i. cah. 2. Ritter, le Sidérisme, etc.

[b] The following general results have been established with regard to the distribution of metals. 1. They decrease in variety and quantity, from the primitive to the alluvial period. 2. Molybdena, Titanium, Tin, Tungsten, Cerium, Tantalum, Uranium, Chrome, and Bismuth, are of the oldest primitive formation; only faint traces of them in more recent rocks. 3. Arsenic, Cobalt, Nickel, Silver, and Copper, occur in the oldest primitive, and also in the newer formations. 4. Gold, Tellurium, Antimony, and Manganese, are of a middle age, occurring in the newer primitive, the transition, and the oldest secondary rocks. 5. Lead, Zinc, and Mercury, are of later date, most abundant in the secondary formations. 6. Iron is universally distributed from the oldest granite to the newest alluvium. 7. The more crystalline ores abound in the primitive, and are continually decreasing in the newer formations.—P.

[c] It is also found in Estramadura in Spain.—T.

[d] Platina has been recently found in veins, in the Val de Osos in Antioquia; and in alluvial grains, in the same locality. The localities given in the text, are all in the provinces of Choco and Antioquia, in New-Granada, now Colombia. They are all in alluvial deposites, along with magnetic iron sand, gold, &c., and rolled fragments of greenstone and basalt. Platina has been found in the gold mines of Brazil, in a purer state than in Colombia, along with grains of Palladium; also in alluvial sand, in the eastern part of St. Domingo. It is found in Estramadura, in some of the gray copper ores of Guadalcanal; it does not there contain any of the new metals. It is found also abundantly in alluvion, in Permia, in the Uralian Mountains; in the same situation also, at Barbacoas, a town 120 miles N. of Quito.—P.

[e] Fourcroy et Vauquelin, Annales du Muséum, tome iii. p. 149; tome iv. p. 77. *sqq.*

[f] The four new metals contained in the ores of Platina, are Palladium, Rhodium, Iridium, and Osmium.—P.

[g] Or about $\frac{1}{13\,2\,5\,2\,5}$, according to the scale of Fahrenheit. One degree of Reaumur being supposed equal to $2\frac{1}{4}$ of Fahrenheit.—T.

[h] *Grès* sometimes means flint or silicious substances, and sometimes is translated free-stone. The context must determine which it designates.—T.

[i] Werner, Nouvelle Théorie des Filons, § 77.

[k] Chaptal, Elémens de Chimie, tom iii. p 401.

$2\frac{14}{100}$ grammes, or 40 $\frac{1}{10}$ grains of gold, from 489 hectogrammes, or a quintal of ashes. Werner assures us, that at Zalatna, native gold has been found in half petrified wood, or rather, says he, in bituminous wood.[a]

The mine of gold in Norway is poorer than that in Sweden; those of the north produce altogether scarcely the twentieth part of the quantity furnished by that of Nagyag in Transylvania, or that of Kremnitz in Hungary. But what indeed are all the gold mines of Europe, taken together, in comparison of one single mine in Peru or Brazil? In going from La Paz, towards Potosi, and Tucuman, all the beds of clayey schist are found penetrated with veins of auriferous quartz; and the fall of a shelf of rock discovers masses of gold from 2 to 300 pounds in weight.[b] The islands of Borneo, of Celebes, or Macassar, and of Sumatra, situated under the equator, contain very rich mines of gold, though badly worked.[c]

Europe has also rivers, which carry along with them some grains of gold; but in Africa, in searching along the rivers, we find almost every where auriferous sand. In Nigritia, the natives are regularly employed every year in this golden harvest, after having finished that of the corn. Near Akim, upon the coast of Guinea, one person may pick up several ounces a day.[d] This increasing abundance of one of the most weighty and dense metals, as we approach the equator, presents to us a question, as interesting as it is difficult to solve.

The valuable qualities of gold render it worthy of the rank which opinion has assigned to it among metals. Less brilliant than platina, it has a colour more agreeable to the eye. Thus, the poets have not failed to give golden locks to Apollo; to Jupiter a throne of gold; Vulcan employs gold to forge a buckler for Achilles; in short, in the form of an adjective, the words gold and beauty are synonymous among the Greeks. Tractable in the hands of art, from its great ductility, gold assumes every form which we wish it to acquire. The goldsmith, the jeweller, the embroiderer, and the gilder, employ it with equal facility. It is capable of the most astonishing superficial extension, thus making up, in some measure, for its scarceness, by its ductility. A quantity of gold, of the weight of one grain (53 milligrammes) can be beaten out into a sheet, the surface of which will cover 50 square inches, or $3\frac{65}{100}$ square decimetres; and when used in the gilding of silver wire, its extension is nearly sixteen times greater. The tenacity of gold is such, says Haüy, that one thread of this metal, of $2\frac{7}{10}$ millimetres, or $\frac{1}{10}$ of an inch in diameter, can support a weight of $244\frac{8}{10}$ kilogrammes, or 500 pounds, without breaking. As gold is very soft, it must be mixed with copper, when coined into money. This alloy gives it a reddish tinge. Gold acquires a resinous electricity.[e]

Native silver is rarely found pure in the bosom of the earth; it is sometimes mixed with copper and iron, and sometimes with gold, but more frequently with arsenic. The same province of South America which possesses the richest gold mines, namely, Peru, contains also great treasures of silver.

The mines of Potosi produced, from the year 1545 to 1648, about 395,619,000 piastres, but they are exhausted. In North America, Mexico abounds in silver, about 22 millions of piastres being derived from it every year.[f] Silver is apparently diffused throughout the whole extent of the old continent; but the mines which are now best known, are almost all found in the northern temperate zone. Those of Siberia, of Saxony, and of Hartz, are at the 50th degree of latitude—those of Kongsberg in Norway, at the 60th degree. The produce of these mines, however, is trifling, compared to the mineral riches of America, which are contained within the two parallels, distant thirty degrees from the equator. We are ignorant whether Africa possesses mines of silver equal to those of the New World.

Silver is found in quartz, lime stone, sulphuretted zinc, and sometimes in petrosilex;[g] it is rarely met with in granite rocks. At Frankenberg, in Hesse, leaves of native silver are found adhering to petrifactions.[h] This metal exists in grains (though rarely,) in a thread-like form, in thin laminæ, in ramifications, in octahedral crystals, and sometimes in very considerable masses. We are assured, that one was found at Schneeberg, in Saxony, in 1478, which weighed 400 quintals, or 196 kilogrammes.[i] Another mass was found at Kongsberg, of the weight of 560 marks, (about 270 kilogrammes,) and is preserved in the Royal Museum at Copenhagen. Bergmann says, that there have been found in the sands, on the coasts of Peru, masses of 150 marks of silver entirely pure.

Silver is, next to gold and platina, the most unalterable of the metals—its surface only blackens in those places where there are sulphureous and inflammable vapours.[k] It is remarkable that silver, alloyed with a considerable portion of gold or copper, preserves its white colour; whilst a small quantity of silver or copper, mixed with gold, changes very sensibly the colour of this latter metal. This phenomenon, common to all white metals, made Newton imagine, that the particles of white metals have much more surface than those of yellow metals, and that they are also very opaque; so that they cover the gold and copper, without permitting the colour of these metals to pierce through theirs. They ought, on the other hand, to be more thin, because the white light which they reflect, answers to a greater degree of tenuity, than the yellow of gold or copper.[l] According to the experiments of Brisson, and the calculations of Haüy,[m] the specific gravity of a mixture of gold and copper, exceeds the sum of the specific gravities of the two metals when separate about $\frac{1}{17}$. On the contrary, the specific gravity of a mixture of silver and copper, is less than the total of the specific gravities of the two metals, by about $\frac{1}{18}$. Another physical quality of silver is still more worthy of our attention, the property

[a] Théorie des Filons, loc. cit.
[b] Helm, Journal d'un Voyage de Buenos Ayres à Lima, (en All.)
[c] Mem. de la Société de Batavia, ii. 166, iv. 589, etc.
[d] "Ten ounces."
[e] Haüy, Annales du Muséum. iii. 309. *sqq.*
[f] Humboldt, Essai Politique sur la Nouvelle Espagne.
[g] Bergmann, Géographie Physique, i. 266.
[h] Werner, Nouvelle Théorie des Filons, § 78 & 79.
[i] Haüy Minéralogie, vol. iii. p. 388. note 2.
[k] Silver is blackened by sulphuretted hydrogen. A film is formed on its surface, which is a sulphuret of silver.—P.
[l] Newton, Optice Lucis. lib. ii. part 3. proposit. 7.
[m] Haüy, Minéralogie. tom. iii. p. 380 & 390

which it has, when dissolved in nitric acid, of crystallizing under a kind of vegetable or arborescent form, producing what is called the tree of Diana. It would seem, that the crystals of which this kind of mineral vegetation is composed, may be considered as small magnetic rods, whose poles, by attracting and repelling each other, determine their respective positions.[a] Silver, though less rare than gold, has been preferred to that metal, as a representative of value; the resistance which it opposes to the action of the air and humidity; its brilliant whiteness, and its malleability, render it applicable to a multiplicity of purposes both useful and ornamental, which are too well known to require enumeration.

Sulphuret of silver, that is, silver combined with about $\frac{1}{7}$ of sulphur, commonly bears the absurd name of (*mine d'argent vitreuse*) vitreous silver, though it has not even the exterior appearance of glass. Antimonial sulphuretted silver is commonly called red silver, and the fine lively red, which is the essential colour of it, justifies the name. The transparent crystals of this metal form not a bad imitation of the ruby; the more beautiful they are, the less silver they contain.

Native mercury is generally found in brilliant and moveable globules, disseminated in clayey schist, as at Idria in Friuli, or rather in Carniola; in marl, in quartz, as in the district of Deux Ponts, and in primitive lime stone, as at Almaden in Spain. This metal requires so little heat for its fusion, that the atmosphere almost always contains enough to preserve it in the fluid state. The cold of Siberia, however, and of Northern Russia, sometimes converts it into the solid form, which has been erroneously considered as congelation; it is then almost as malleable as tin,[b] and admits of being extended into very thin sheets:[c] besides, its oxide repasses to the metallic state, without the intervention of any foreign substance. It possesses, then, the essential qualities of metals, and approaches the nature of those that are the most perfect. Mercury amalgamates with almost all metallic substances, but chiefly with gold, silver, tin, and bismuth;[d] it is this property, joined to the facility with which it evaporates, that causes it to be employed in gilding, and in working mines of gold and silver. The silvering of glass is effected by an amalgam of mercury and tin. Philosophers make use of the same amalgam to spread upon the rubbers of electric machines. The efficacy of medicines formed of oxides of mercury, is entirely owing to the facility with which these oxides are decomposed by parting with their oxygen.[e] All these physical and chemical qualities show what an important part mercury would act in the formation of our earth, if it existed there in great quantities. At present, this metal is found only in very small portions, and at great distances—it seems to fail in countries in the vicinity of the arctic pole. The whole of Siberia presents to us only two or three ambiguous specimens.[f] The New Continent is not more abundantly provided with it. The natural amalgam of mercury and silver, is called silvery mercury.[g] It remains for us only to notice the sulphuret of mercury, well known under the name of cinnabar, or vermilion cinnabar, and which is sometimes found in regular veins.

An ignoble metal claims the rank next to mercury, that is, lead, a substance of very dense structure, but extremely deficient in point of hardness, elasticity, and even ductility. It is, however, of great utility in its metallic state; conduit pipes, balls for guns, and other plain and coarse implements are made of it; and the oxides of lead are employed in many of the arts. It is lead which gives to glass an unctuosity and softness which render it susceptible of being easily cut and polished. It is to lead, or to its red oxide, that the glass, called flint glass, owes the quality which renders it so valuable for the construction of the object glasses of achromatic telescopes,—the quality of divesting the images of those colours, with which they appear to be edged when we view them through a common telescope. The oxides of lead furnish a variety of colours both to the pallet of the painter, and the toilet of the modern Laïs.

This metal is generally found mineralized by sulphur, forming an ore commonly called galêna, which is almost always mixed with iron, with antimony, and especially with silver. This ore is generally worked only for the purpose of extracting from it the silver it contains. Werner specifies seventeen formations of galena of different periods, in all sorts of rocks, from quartz to pit-coal.[h] There are no kind of mines more common in Europe. The kind of galena which contains silver, is met with even in Danish Lapland. But lead is not found in abundance, any where in the North of Europe, or Asia. It begins to discover itself in great quantities, only in Germany, France, and England. We are assured that in the interior of Louisiana, it forms vast beds upon the surface.[i] Carbonate of lead, or mineral white lead, often accompanies galêna; it is an oxide mineralized by carbonic acid. Molybdate of lead, or the oxide mineralized by molybdic acid, is found at Bleyberg in Carinthia; it generally bears the name of yellow lead. The red lead of Berezof in Siberia is mineralized by the chromic acid. It is still doubtful whether there exists any lead in the native state.

Nickel is not a very ductile metal; it is of no use in the arts, but it possesses some magnetic properties.[k] It generally accompanies cobalt, an equally magnetic substance; these two metals, of a nature nearly allied to that of iron, and often containing particles of it, seem to occur most plentifully in the north.[l]

Copper, one of the metals of which nature is most lavish, appears to occupy two great regions of the globe

[a] Ritter, Mémoires sur le Galvanisme, i. cah. 2. p. 280.

[b] Bergmann, Géog. Phys. i. 227. Comp. Hachette et Hassenfratz, dans le Journal de l'École Polytechnique, i. cah. p. 123. et suiv.

[c] Braun. Comment. Petrop. novi. xi. p. 268. Blagden, Philosoph. Transact. 1783. vol. lxxiii. p. 329.

[d] Gellert. Principes de Chimie Docimastique, 152, (en All.)

[e] The opinion, in the text, is not well founded. The most active preparation of mercury, *the Perchloride* (corrosive sublimate,) according to the established doctrines in chemistry, contains no oxygen whatever. It is a compound of chlorine 26.47 parts, and mercury 73.53 parts.—P.

[f] Georgi, Description de la Russie, iii. 406.

[g] "*Mercure argental.*"

[h] Werner, Théorie des Filons, p. 156-161 (en All.)

[i] See Description de la Louisiane.

[k] Expériences de Biot, cité dans les Tableaux des Espèces Minéraux de Lucas, p. 297. Comp. Haüy Minéral. iii. 512.

[l] Nickel, as well as Cobalt, is capable of acquiring polarity, and may be formed into permanent magnetic needles. It does not rust by exposure to air and water. It is an invariable constituent (1 to 3 per cent.) in meteoric stones, and in those masses of native iron, found on the earth's surface, supposed to have been of meteoric origin. It renders those masses whiter, more malleable, and less oxidable, than forged iron.—P

which admit of being distinctly defined. We know that it abounds in Norway, in Sweden, in Hungary, in England, in the Uralian mountains, throughout all Siberia, in Chinese Tartary, and Japan. We must also add, that several islands between Kamtchatka and America produce masses of native copper;[a] that immense beds of it are found upon the banks of the Ohio,[b c] and lastly, that there have been signs of its existence in Greenland, and in Iceland.[d] This metal then seems to be common to all the countries situated in a zone of about 45 degrees of latitude around the northern pole. But it is found on the other side, over all the south of Africa, from Congo,[e] to the Cape of Good Hope,[f] and according to Benyouski in Madagascar. The southern extremity of America appears also to contain considerable mines of it;[g h] and Brazil presents to our notice, an immense block of it in the native state. It appears then, that this mineral is accumulated at the two extremities of the two great continents. We must at the same time admit, that this interesting sketch may meet with objections, drawn from the existence of extensive mines of copper in the country of Morocco,[i] in the island of Cyprus, and Turkish Armenia, mines which by connecting together the two regions that have just been pointed out, compel us to regard copper as a substance common to all the zones of our planet.

With respect to native copper, naturalists agree in distinguishing two different formations; copper of the first formation is in crystals, in thin plates, in threads, in clusters, which are commonly found attached to quartz, or schist, and sometimes primitive limestone, as is the case near Ekaterinbourg in Siberia, and at Tunaberg in Sweden.

The copper of cementation is of more recent formation; it is obtained from sulphate of copper, (commonly called vitriol,) held in solution in water, and decomposed by the application of heat. It forms concretions upon different stony substances, and even upon organic bodies. Waters impregnated with particles of copper, are called cementatory waters. Among the ores of copper, the most common is copper pyrites. In the mines of Kopparberg in Sweden, of Rœras in Norway, in those of Siberia, and in general in all the great copper works, this metal is principally obtained from pyrites of a yellow or iris colour, in which it is found mineralized by iron and sulphur. The gray-coloured copper contains silver, antimony, lead, sulphur, &c. The sulphuret of copper, or copper combined principally with sulphur, has a vitreous appearance. In the state of oxide, copper assumes various tints, red, blue, or green. The silky or pearly carbonate of copper, (the satin-like ore of Bergmann,) presents a green colour like an emerald, softened by a sort of satin lustre, which has the effect of giving it a more beautiful appearance. This same copper, in a state of concretion, forms the substance named malachite, which is susceptible of a fine polish, and of which the cheeks of chimneys, snuff boxes, and various trinkets are made. It is, to use the happy expression of M. Haüy, the alabaster of metallic substances.[k]

As it is the province of political geography to treat of manufactories which have the working of metals for their object, we shall be pardoned, we trust, if we mention in a few words the eminently useful qualities of copper. This mineral, while it is much more ductile than iron, is also more durable than tin and lead. Its tenacity is such, that a wire of copper of 2.7 millimetres, or $\frac{1}{10}$ of an inch diameter, can sustain without breaking, a weight of 146.38 kilograms, or about 320 pounds English.[l] The useful qualities of copper are partly balanced by its very changeable nature. Exposed to the air, or to damp, it is very soon covered with that rust known under the name of verdigris, which is one of the most active poisons. When melted and refined, it is called purified or rose copper,[m] which is less dense than native copper. What we call yellow copper, or brass, is a compound of copper and zinc, which is obtained by the cementation of copper with calamine,[n] and which, from being less subject to rust, furnishes the watchmaker, the mechanical philosopher, and the geometrician, with so many instruments of general use, exquisitely delicate in their workmanship, and at the same time of great durability. But if the two metals are directly united by fusion, the mixture takes the names of pinchbeck,[o] tombac, and gold of Manheim. Brass dilates $\frac{1}{432\,0\,0}$, for every degree of Reaumur, and $\frac{1}{54\,0\,0\,0\,0}$, for every degree of the centrigrade thermometer.[p] The specific gravity of brass is about $\frac{1}{10}$ more than the sum of the two specific gravities of copper and zinc. Bronze is made by uniting a certain quantity of tin with copper; it is more elastic and sonorous than pure copper. It is this compound, that is to say, the perverted use of it, which, following the steps of the conqueror, hurls forth the thunderbolts of war against peaceful nations. It was of bronze that the genius of the Greeks fashioned the august images of their gods, and the cherished features of the benefactors of the earth. Without the aid of copper and iron, man could neither have attained his present height of civilization, nor have lent to crime the destroying energy of the infernal powers. But let us return to the subject immediately before us.

Cobalt, which partakes with oxidulated iron a magnetic property in an eminent degree, seems to be of two formations of different ages. The white cobalt of Werner, (or gray cobalt of Haüy,) is frequently found in veins in the secondary mountains of Hesse and Thuringia. The arsenical cobalt of Haüy, which Werner calls

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[a] Georgi, Russie, 424. Sauer. etc.

[b] Michaux, Voyages aux états de l'Ouest.

[c] It is not known that copper occurs in any quantity on the Ohio. A large mass of native copper, and abundant indications of copper ores have been found along the southern shores of Lake Superior. The associated rock appears to be sand-stone.—P.

[d] In almost all his descriptions of mines either of metals or coals, M. Malte-Brun seems to forget there is such a country as England, remarkable for its mines of tin, lead, iron, copper, and coals. At the time when he wrote, it was the fashion, if possible, to forget it.—T.

[e] Lopez. Relazione di Congo, p. 14. Cavazzi. trad. de Labat. i. 35.

[f] Sparmann, Voyage, 596. (en All.) Patterson, Barrow. etc. etc.

[g] Vidaure, Istoria Geografica di Chili.

[h] Copper is very abundant in Chili, particularly in the northern parts of it, from 24° to 36° S., in the districts of Copiapo and Coquimbo, where more than 1000 mines have been opened.—P.

[i] Hœst, Notices de Maroc. (trad. du Dan. en All.) p. 310. Chenier. etc.

[k] Haüy, Minéralogie, iii. 575.

[l] "About 299 lbs. 4 oz." Fr. Wt.

[m] "*Cuivre de rosette.*"

[n] Calamine is the ore which furnishes zinc in greatest abundance—T.

[o] "*Similor.*"

[p] Borda cited by Haüy, ibid. p. 526.

shining cobalt, exists only in the primitive rocks, and is accompanied by quartz and primitive limestone. This mineral is employed to make a fine blue glass, named smalt, which, in a pulverized state, is known under the name of Saxon blue.[a]

Tin is of a formation, which, according to a celebrated mineralogist, carries us back to one of the remotest periods in the history of the globe; it has never been found in secondary mountains; it exists, however, he says, in all porphyries. The singular manner in which tin mines are distributed upon the surface of the globe, appears to us to be extremely remarkable. This metal is found in Cornwall in England, in Saxony, in Bohemia; it is scarcely ever met with in other parts of Europe; it entirely disappears when we penetrate into the interior of the ancient continent, and does not again discover itself till we reach the peninsula of India, on this side of the Ganges,[b] whence its mines extend to the peninsula of Malacca, and to the islands of Sumatra, Banca, and Japan. Africa and South America produce but little of it. Tin, which is used in the arts for coating glass, for solder, for fabricating utensils, and for the composition of scarlet, possesses the singular property of rendering harder, and more sonorous the metals with which it is mixed although by itself it is deficient in these two qualities. At the same time, it takes away ductility from metals possessing that quality in a high degree, while it does not diminish the ductility of the less ductile metals.[c]

Iron is profusely distributed throughout nature. It enters either as a colouring or a combining principle into a great number of mineral substances; it is a stranger neither to vegetables, whose tints it enlivens, nor to animals, upon whom it exerts a salutary influence. As an insulated substance, it is found in almost every part of the ancient continent; it is however, more common, or, at least, accessible to our researches in the northern temperate zone, particularly towards the northern part of it.

What an immense quantity of iron is contained in the mountains of Scandinavia alone! The mountain of Taberg, to the south of Sweden, presents only one entire mass of this mineral. The north of Asia equally abounds in iron; the imperfect accounts which we have received of Canada, and the northern parts of the United States, inform us that these regions are provided with excellent iron, though copper appears to predominate there.[d] Southern Africa, it would seem, abounds equally in iron, as in copper.[e] No kind of rock or earth is a stranger to it. It is found in granite in detached masses, in schist in veins, and in free-stone in beds; it exists in mud, and turf.

The great masses of native iron, found in Siberia by Pallas,[f] and in America by Rubin de Cilis,[g] have been for a long time considered by most naturalists as productions of art, or of volcanic agents.[h] Wallerius, in stating that native iron is found upon the borders of Senegal, has merely copied from ancient travellers, whose narratives want precision. But, it is an undoubted fact, that the substances found at Kamsdorf in Saxony,[i] and at Oulle in Dauphiny,[k] are actually natural productions; and why cannot nature present to us iron in its pure state, since it offers it to us under the form of very hard and compact steel?[l][m] The most ancient iron ore, according to Werner, is that of magnetic iron, which Haüy calls oxidulated iron; it is to a variety of this ore that the name of loadstone has been given. We shall speak elsewhere of the phenomena which this substance presents. The gray or specular ore of iron, (the oligiste iron of Haüy,) abounds in Sweden, in Norway, in the Island of Elba, and at Framont in the Vosges; it is the most easy to work of all the ores of iron. Sparry iron ore is only a carbonate of lime, more or less mixed with iron; the lime with which the ore is combined facilitates the fusion. The iron which is drawn from it is of an excellent quality, and it has a very great tendency to pass into steel, even in the first fusion: this is what is called steel ore.[n] A kind very generally distributed, and commonly worked, is that of oxidated iron, which comprehends, among others, the hematites, the ochres, the martial géodes, and particularly the iron in globules, similar to peas or eggs.[o] The metal obtained from oxide of iron in globular masses, sometimes contains a certain quantity of phosphoric acid, which renders it brittle and inductile; this is what the French call *fer cassant à froid*, and we, cold short iron.

Sulphuret of iron, which is commonly named martial or ferruginous pyrites, is one of the most remarkable substances which enter into the composition of the globe. It is very extensively distributed, being found in quartz, in marl, in the argillaceous schist which lies upon coal, and it is even mixed with coal itself. In the greatest depths to which man has ever been able to penetrate in the most considerable mines, we continue to observe the ferruginous pyrites, until our progress is arrested by the subterraneous waters.[p] There is auriferous pyrites, which although chiefly consisting of decomposed sulphuret of iron, is worked as an ore of gold, and with the view of extracting from it this last metal. Such are the gold ores of Berezof in Siberia, of Adelfors in Sweden, and others. The origin of hæmatites, and ferruginous ochres, is owing, according to the opinion of the majority of naturalists, to the decomposition of sulphu-

[a] Werner, Théorie des Filons, ch. vii. § 76.

[b] Wahl, Ostindien, ii. 746. (en All.)

[c] Rinmann, History of Iron, § 146, p. 493. (in German.) Bergmann, Opusc. Phys. ii. 471.

[d] Copper is by no means abundant in the Northern Atlantic districts of the U. States; but iron is very abundant there, in the three forms of magnetic oxyd, brown hematite, and clay iron ore, from the oldest primitive, to the most recent tertiary formations.—P.

[e] Cavazzi, i. 83. Thomann, 113.

[f] Bergmann, Sciagraphia, Edit. de Delamétherie, ii. 153. Romé de l'Isle, Cristallog. iii. 167.

[g] Annales de Chimie, v. p. 149.

[h] Native iron has been found in veins, disseminated in the brown oxyd at Oulle and Kamsdorf. It usually occurs in insulated masses on the earth's surface, generally at a distance from mines of iron. In many of these masses, and probably in all, it is slightly alloyed with nickel, resembling in this, the meteoric stones. Some of these masses are of immense size, and have been regarded with superstitious veneration, by the neighbouring inhabitants. Such masses have been found in Siberia, near the Jenisei; near St. Jago del Estero, in Tucuman (15 tons); near the Senegal; near Agram, in Croatia, known to be meteoric; at Aken, near Magdeburg (8 tons); at Bithburg, in Luxemburg; near the Red river, Louisiana (3000 lbs.) &c.—P.

[i] Brochant, Minéralogie, ii. 217.

[k] Schreiber, Journal de Physique, xii. p. 3. *sqq.*

[l] Godon Saint-Menin, Journal de Physique, lx. 340. *sqq.*

[m] The steel is the result of fusion, not a natural production. It is obtained from the reduction of carbonate of iron or sparry ore.—P.

[n] Haüy, ii. 180. et suiv. iv. 117, 118.

[o] Nodular iron ore.

[p] Henkel, Pyritologie, trad. Franc. p. 97.

retted iron, the remains of which the running waters have carried along with them; hence they are called transported ores, in order to distinguish them from other ores which seem to have been formed in the spot where they are found. These transported ores then are of recent formation, compared with the others, and one can easily suppose that they are formed every day.

Vitriol of iron is nothing else than the sulphate of iron, which is generally procured from the decomposition of sulphuretted iron. Sulphate of iron, or vitriol, is of great service in dyeing; it is used as the principle of black colour, from the property which gall nuts and other astringent vegetables possess, of precipitating iron contained in the vitriol under the form of black particles of extreme fineness.

Emery is an oxide of iron, intimately united with alumina and silex. This substance is valuable in the arts, on account of its great hardness. By grinding it in steel mills, it is reduced to a powder, whose sharp and hard particles can, by the application of friction, give a polish to all existing substances, except the diamond.

"Iron," says M. Haüy,[a] "such as nature produces it, is very different from that whose appearance and use are so familiar to us. It is usually nothing but an earthy mass, a dirty and impure rust; and even when iron presents itself to us in the mine with metallic brightness, it is still very far from possessing the qualities required for the multiplicity of uses to which it can be applied. While man need only purify gold, he must, if the expression be allowed, create iron." This metal is generally susceptible of three different states. What is called cast or pig iron, is the metal after its first fusion, deprived of a more or less considerable portion of its oxygen, and combined with a part of the carbon with which it came in contact in the casting furnace. Cast iron is not yet rendered malleable; for it is peculiar to iron, that of the two properties of fusibility, and ductility under the hammer, it can possess the one only at the expense of the other. To render iron ductile, it is again submitted to the action of a furnace,[b] the elevated temperature of which determines, by a new exertion of affinities, the oxygen remaining in the cast iron to combine with the carbon, which had been incorporated with the iron, and thus to form carbonic acid, which constantly disengages itself from the mass. Iron, after this process, is found in the greatest state of purity to which art can bring it. It is then exposed to the action of a large hammer, whose redoubled strokes, by bringing the metallic particles into closer contact, unite them more perfectly together, and render the iron ductile. It is then called forged iron. In this new state it is no longer fusible; and the most violent heat of our furnaces can at most only soften it, and convert it into a kind of paste. Forged iron, placed in contact with carbonaceous substances, and again softened by the action of fire, till it enters into combination with these substances, or rather with the carbon which they contain, is converted into steel. The operation of tempering which steel undergoes does not change its nature, it only varies the arrangement and aggregation of its particles; it augments at once its hardness, its brittleness, and its volume, and gives it a coarser grain than that of steel not tempered.[c] Thus the difference between cast iron, forged iron, and steel, depends on two principles, namely, oxygen and carbon: their union consitutes cast iron; the absence of both, at least in a perceptible quantity, characterizes forged iron; and, in steel, carbon exists alone without oxygen.

We shall say nothing of the use of iron in its three states; it is universally known. We shall only observe, that the tenacity of iron is such, that this metal reduced into a wire of about 2.7 millimetres, or $\frac{1}{10}$ of an inch thickness, can support without breaking a weight of 210.3 kilogrammes, or 450 French pounds. Iron is very oxidable, and it exerts a very strong elective affinity to sulphur. United with silex and alumina, it imparts an extreme hardness to the rocks which contain it. Thus, there is no metal which allows itself to be so easily decomposed, and no metal forms a more unalterable cement. Its magnetic virtue readily communicates itself to the other metals with which it is mixed; $\frac{4}{100}$ of iron make copper magnetic, $\frac{5}{100}$ have the same effect upon tin.[d] These physical qualities prove what an important part it must have acted in the formation of those aggregate substances which compose our globe.

Zinc, which forms the connecting link between the ductile metals, and those which are not so, is found oxidated, and then it is commonly called calamine, or lapis calaminaris. There are mines of it in Alsace, in Normandy, near Aix la Chapelle, in Brisgaw, in Carinthia, in the county of Somerset in England, and many other places. Calamine, according to Werner, is not found in the primitive rocks. It oftener occurs sulphuretted, and then the vulgar name of it is Pseudo-galena, or blende. This mineral is scattered over Sweden, Norway, Saxony, and Bohemia, and we may say almost every where. It generally accompanies galena, or sulphuret of lead. It is often mixed with iron, gold, and silver. The sulphate of zinc, which is rarely a product of nature, is called white vitriol, or white copperas. The metal that is brought from India, under the name of tutenag, is, according to Bergmann,[e] zinc in a state of purity. If the air be admitted to zinc when brought almost to a white heat, the metal burns with a splendour which nothing can equal, and which is too dazzling for the eye to support.[f] This property serves to characterize zinc not only among the metals, but even among all combustible minerals.

Bismuth, from its great fusibility, is used for alloys with various other metals; it is found, according to Werner, only in the primitive mountains; it occurs, however, attached to jasper. Of all the minerals easily oxidable, it is the only one which is found more frequently in a metallic form, than in that of an ore properly so called.[g] [h]

[a] Haüy, Mineral. iv. 2.
[b] "*Fourneau d'affinage.*" Finery.—P.
[c] Vandermonde, Monge et Berthollet, Memoires de l'Académie des Sciences, 1781.
[d] Rinmann, Histoire du Fer, i. p. 146. (en All.)
[e] Bergmann, Géog. Phys. i. 233.
[f] Macquer, Dictionnaire de Chimie.
[g] Brongniart, ii. 131.
[h] It is used in the composition of printer's types, soft solder, &c.; for increasing the fusibility of glass, and for giving a greater hardness to lead. It melts at 476°, Fahr., and may be fused in the flame of a candle. Alloyed with lead and tin, in the proportions of 8, 5 and 3, it melts in boiling water (212°.)—P.

Manganese very often accompanies ores of iron, particularly in the secondary mountains; it is a colouring principle very extensively distributed in nature; and it is that which gives a violet hue to the crystals of fluate of lime, and to a number of the schorls. Mixed in a small quantity with the substance of white glass, it has the property of clarifying it, and of freeing it from false colours.

Antimony, once celebrated in the laboratories of the alchymists, who hoped to discover in it the philosopher's stone, is now employed with success in the composition of various medicines, in the casting of types for printing, and as an alloy with tin, to form what is named prince's metal. It is found native in quartz and primitive limestone; sulphuretted or gray in the secondary mountains, and often also united with galena. Capillary antimony often contains silver, and has been called plumose silvery antimonial ore.[a] The crystallization of fused antimony, presents a stellular and foliated appearance.[b]

Scheelin was, until very lately, called by the Swedish name Tungsten. It is a very weighty mineral, obtained from a ferruginous striated substance, known under the German name of Wolfram. It is principally found in the primitive mountains, and often accompanies tin.

Uranium is a metal lately discovered, and comprehends the varieties once called horn copper (cuivre corné,) and pech-blende. It is, according to Werner, of ancient formation.

Tellurium, another metal recently observed, is found chiefly in the auriferous mine of Nagyag in Transylvania, which gives from 45 to 170 ounces of silver to the quintal, and from 200 to 210 deniers of gold to the marc.[c] Tellurium is attached to quartz and manganese; it is still very rare.

Molybdenum appears to be of ancient formation—small masses of it are found in granite, in several places of Sweden, Norway, Saxony, and Bohemia.[d]

Arsenic, the name of which alone excites an emotion of terror, is not often found by itself; but it serves to mineralize a great number of metals: rubbed or warmed, it discovers itself by the smell of garlic, which it emits. In its native metallic state, it is of a steel-gray colour. It is the oxide of arsenic, under the form of a white powder, which constitutes one of the most violent poisons. That which is met with around volcanos, is mineralized by sulphur.

Titanium, another metal of modern discovery, is found in a state of red oxide, under the form of a ferruginous stone, and united with silex and lime. Of all the new minerals, it is the one which is most interesting to physical geography: it seems to occupy the same place in relation to iron in the primordial mountains, that manganese holds in those of secondary formation.[e] All the iron which is found in the primitive trapp of Norway, particularly near Arendal, is more or less combined with titanium.[f]

Chrome, which colours the emerald; tantalium, which is insoluble in acids; cerium, discovered like the preceding, by Swedish philosophers; columbium, procured from the United States,[g] &c.; and three or four metals which are found combined with platina,[h] have not yet acquired importance enough to claim our attention. The multiplicity, however, of the substances which chemistry has discovered, should inspire us with a salutary distrust of systems which tend to establish general analogies between bodies, of the very number, not to say the properties, of which, our knowledge is as yet so vague and imperfect.

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[a] "*Mine d'argent en plumes.*" Plumose antimonial silver.—P.

[b] Haüy, iv. 259.

[c] The tellurium ore of Nagyag, contains, in combination, 26.75 of gold and 8.5 of silver, in 100. It is wrought for the gold and silver it contains.—P.

[d] Steffens, l. c. 158.

[e] Manganese is more usually found in the primitive rocks. It however occurs in the secondary rocks, particularly disseminated, and as a colouring matter. Limestones, containing manganese, furnish a lime which hardens under water.—P.

[f] Steffens, l. c. 158.

[g] Columbium is the same as Tantalium.—P.

[h] Palladium, Rhodium, Iridium, and Osmium.—P.

BOOK XI.

Continuation of the Theory of Geography. Of the Aggregate Substances which compose the Solid part of the Globe. First Part: Of Rocks and Earths, and Volcanic Productions.

We have already considered the simple substances which enter into the composition of our globe; and in surveying them, we have been constantly on our guard against the influence of systems, which pretend to determine the period and manner of the formation of these substances. This was not an arduous task: we had only to follow, though with very different views, the track already marked out by the father of modern mineralogy. A more intricate path now lies before us: We come now to the consideration of the *masses* formed by the aggregation of several simple substances, which constitute either rocks or earths, according as they are found in a state of hardness or softness. Here the most enlightened guides differ; and instead of showing us the way, they have to seek for it themselves, amidst the confusion and obscurity arising from the introduction of *general terms*, before *general ideas* had been accurately fixed.

The classification of rocks, founded solely upon the chemical and geometrical characters of the simple substances of which they are composed, overlooks the intermixture and relative position of these masses, that is to say, the two characters under which physical geography ought chiefly to consider them. On the other hand, geological classifications, though formed more in reference to these two points of view, are infected by one capital error, since their characteristic distinctions are derived from the *origin* of rocks. This is unquestionably taking for granted the very point to be proved. To facilitate such a method of systematizing, facts are assumed, the demonstration of which ought to form the ultimate object of the science. Accordingly, the different aspects under which these facts have been viewed, have given rise to as many different forms of phraseology, as there have been celebrated geologists. Basalt, for example, ranged by some among the *trapps*, a species resembling the primitive rocks, is placed by others at the head of lavas, or substances ejected by volcanos. In the present day especially, when the observations of Werner and Cuvier, compared with the discoveries of Davy and the experiments of Hall, have given us a glimpse of a theory of the earth, much more scientific and more comprehensive than the unwieldy systems of the Neptunists and Vulcanists, it is an indispensable prerequisite to a methodical description of aggregate substances, to discover some principle independent of any system that has been founded on opinions entertained as to the origin of these substances. This principle appears to be found in considering these substances as to the *mode of their aggregation*, provided that we confine ourselves to the formation of extensive classes, and do not require more precise limits than those which actually exist in nature. It would seem that nature has placed at wide distances land-marks, which serve to direct our course; but that in the intervals between these land-marks, she has left to our choice a variety of paths, all of them equally good. According to this principle, we think that physical geography should classify aggregate substances in the following manner:

A. Aggregate Substances, *properly so called*, (united according to general laws, chemical or physical.)
   1. *Crystallized Rocks*, or such as have a crystallized texture. (Granite, primitive schist, primitive limestone, porphyry.)
   2. *Conglobated Rocks*, or such as present an union of fragments of crystallized rocks, conglutinated by a crystallized cement. (Primitive pudding stones, amygdaloids.)
   3. *Stratified Rocks*, or such as exhibit a contexture similar to that of a sediment, which had deposited itself in layers. (Limestone composed of shells, sand-stone (*grès*,) jasper, &c.)
      N. B. Stratified substances in the state of softness, are called *stratified earths*. (Clay, marl, &c.)
   4. *Conglomerated Rocks*, or such as present a mixture of fragments of crystallized and stratified rocks, united by a stratified cement. (Breccias[a] and secondary pudding-stones.)
   5. *Coagulated Rocks*, or those presenting the appearance of melted matter, which had been coagulated or congealed. (Basalts of Werner, compact lava, lithoid lava of Dolomieu, Haüy, Faujas, &c.)

B. Associated Substances, (united according to mechanical laws, or according to chemical or physical laws, special and accidental.)
   6. *Earthy Accumulations*, or rocks and earths which exhibit only an association purely mechanical, of parts accumulated one upon another. (Calcareous tufa, &c. breccias united by a cement of tufa, clay deposited by water, and otherwise, (*argile d'alluvion et de transport*,) peat, &c.)
   7. *Volcanic Productions*, or substances thrown out by volcanic fire, through the openings and crevices of the solid surface of the globe. (Vitreous lavas, volcanic cinders, scoriæ, pumice stones.)
   8. *Bolides*, or masses precipitated from the atmosphere.

C. Substances Intercalary or Adventitious, (those which are foreign to the aggregations and associations of mineral substances.)
   9. *Remains of Organic Bodies*, vegetables and animals; (*a*) petrifactions; (*b*) impressions; (*c*) remains in a natural state.[b]

[a] Breccia (Brèche) is an aggregate composed of angular fragments, of the same or different minerals, united by a cement. Pudding-stone is a similar aggregate of rolled or rounded fragments. Breccias are of several kinds, siliceous, calcareous, basaltic, &c. The word "*brèche*," in colloquial language, is applied to the calcareous variety, or *variegated marbles*.—P.

[b] Geology, considered as a purely inductive science, does not include any speculations on the formation of the earth, or the origin of the materials of which it is composed. It is simply a classification of the observations which have been made on the composition, structure, superposition, or interposition, and distribution of the various substances forming the external covering of the earth; for it is confined to the immediate surface, and those slight depths which have been penetrated by mines. In regard to the composition of rocks, it treats of their mineral constituents, and their extraneous or imbedded fossils—to their structure, whether stratified or unstratified, crystalline, granular, or earthy, schistous, compact, &c.—to their superposition, their order of succession, from a lower to a higher level, the inclination and direction of their planes, &c.—to their interposition, their occurrence in extensive formations of other rocks, in the form of beds, veins, &c.—and their distribution, forming ranges or plateaus of elevation, and basins surrounded by such elevations, &c. In regard to their composition, rocks are either primitive or secondary; i. e. they consist of ingredients peculiar to themselves, or they are formed by the debris of earlier formations. Nearly parallel with this division is another, into rocks with or without extraneous fossils, or organic remains. The most important division of rocks from their structure, is into stratified and unstratified. In general the latter are of comparatively small extent, and appear interposed among more extensive stratified formations. A certain regular order of superposition has been observed in rocks, and this may be considered the most important part of geology. In general this order has been revealed by the inclination of strata; the lowest being most inclined, and indeed

Let us rapidly survey the vast laboratory where nature works these wonderful combinations, of which we have been pointing out the most striking and accessible.

Crystallized rocks appear to have been formed by the simultaneous crystallization of several simple substances in a state of chemical solution, and united, according to their affinities, so as to form an homogeneous whole. They have a granulated texture, which loses itself in the dull clammy or compact texture, on the one side, and in the lamellated, on the other.

The rocks which occupy the summit of the scale of crystallization, are incontestably those which have for

almost or quite perpendicular; and the upper gradually becoming more and more horizontal. This arrangement brings the lower strata of rocks to the surface; whereas had all the strata been horizontal, none below the general level could have been known but by excavation. Among these regularly succeeding strata, other unstratified rocks are interposed, in beds or veins. The lowest strata generally appear in the centre of mountain ridges, or elevated plateaus, and the upper strata lie around them, rising to a greater or less elevation on the sides of these ridges and plateaus. Sometimes the lower strata rise to the surface at a lower elevation than the upper, as at the foot of a ridge of mountains, the heights of which are formed by the upper strata;—and in some instances the upper strata appear as insulated caps to mountains, based on lower strata. Often the elevations of the lower strata extend like a brim around a basin occupied by the upper strata; these latter forming concentric zones, gradually narrowing till the centre is covered by the highest stratum. Rocks do not succeed each other according to their composition; but rocks of different composition alternate through the series. The smallest alternations are those of strata. In examining these it will be found, that throughout a considerable extent of strata there will be something like an uniformity of alternation; or that one class of strata will greatly preponderate, and give a general character to the group. Such a group is called a *formation*. These *formations* succeed each other, in a similar order with the individual strata, i. e. *formations* of different composition alternate with each other. Those formations which have an identity or near resemblance in composition or structure, are arranged by Werner under general divisions called suites, such as the limestone and slate formation suites. In tracing upwards the series of stratified formations, we find the lowest primitive and crystalline, in their composition and structure, i. e. crystallized by some unknown process from materials which are found in no other known rocks, unless in the unstratified masses of granite, with which they have an intimate relation. Other higher strata (clay-slates) are compact in their structure; but still apparently primitive in their composition. Rising higher we find rocks aggregated from fragments of other rocks, or formed of masses of limestone and clay, in which are imbedded organic remains. This series of aggregated rocks (conglomerates, sand-stones, &c.) limestones, and clay strata, is continued by successive alternations, to the uppermost strata. Most of these contain organic remains, and these succeed each other in a regular order, from the lower to the higher.

This regular succession of organic fossils is one of the most extraordinary discoveries in geology. In general, the remains of animals, or vegetables, now existing, are found only in the most superficial strata. Lower down are found genera, now existing, but of extinct species; and still lower, both extinct genera and species. There is also another important distinction among the fossils of different strata, or formations. The higher orders of animals and vegetables are found in the uppermost strata; the lowest orders in the lowest strata containing organic remains. No remains of the human species have been found in the regularly stratified formations; or indeed in any, except the most recent, and such as are forming at the present period. The older primitive and crystalline rocks must be distinguished by their composition; but the newer strata containing organic remains are often so similar in composition, although of very distant periods, that they could hardly be distinguished, were it not for their imbedded fossils. These fossils, then, serve as keys for the discrimination of the more recent formations. Connected with these organic remains, are beds of coal or carbonaceous matter, distributed more or less through the series of strata. The lowest beds are composed of carbon simply, and are probably, at least in part, primitive. Bitumen appears in the higher beds, and in the coal formation, so called, are vast beds of the proper bituminous coal. The higher coals become less bituminous, and approach more and more to the composition of recent vegetable matter, ending with peat, a formation of the present period. All these masses of carbonaceous matter, except the very lowest, are accompanied with vegetable remains.—Metals are found accompanying the rock formations, generally in beds or veins; sometimes in interspersed grains. Some metals are found through the entire series of formations; others in the lowest only; others in the more recent. The accompanying metals, therefore, form one of the distinguishing characters of rocks. Other minerals, also, bear the same relation to the great formations, such as sulphur, salt, gypsum, serpentine, &c.—Among these stratified masses, there are interposed other masses not stratified. These, by some geologists, have been considered of igneous origin, forced up from beneath through the dislocated strata. The principal arguments in favour of this opinion are, the appearances of disorder in the adjoining strata; the great inclination of strata, which must have been consolidated in a horizontal position, such as puddingstones; and the appearances of igneous action in the immediately adjoining rocks, such as vitrification, induration, as of chalk into hard limestone, and of slate and sand-stone into jasper, the cindery appearance of coals, &c. However this may be, such unstratified rocks occur more or less in all the regular stratified formations, from the granite beds of the oldest primitive, to the basalt intersecting the most recent strata. Closely allied to them in structure, and relative position among the stratified rocks, are the rocks of decidedly volcanic formation, whether of extinct or active volcanos. Above the regular strata, whether loose or consolidated, are extensive beds of gravel thrown loosely together containing fragments of all the older rocks. These have been considered by some (Buckland, Conybeare, &c.) as the effect of diluvial action, extended over the whole earth's surface. Among the fragments are often found immense rolled masses (bowlders) of granite and other primitive rocks, at very great distances from any such rocks *in situ*. Others (Fleming) think these masses were the result of local causes, and not of a general diluvial current. Still more recent are those formations which are the acknowledged effect of causes now in action; such as banks formed by the washings of the sea and rivers, deltas, bogs, and marshes; these are properly alluvial. Other rock masses are formed by the cementation of loose beds by oxyd of iron or limestone, a process still going on;—others by the stony deposites around various mineral springs; limestone very common; siliceous, at Geyser. Beds of sulphur, asphaltum, salt, natron, &c. are also formed around springs, or waters impregnated with them; the two latter, particularly, on the bottoms of saline lakes. The various eruptions and ejections of active volcanos also contribute to new formations. Zoophytes rear up immense masses of coral; and beds of shells are still hardening into rocks.

Werner laid it down as a principle in his system, that the different formations were formed around the entire globe, layer over layer; and that where any of the formations are deficient, this deficiency is owing to their abrasion. This doctrine is probably not true. Whether the formations can be considered of universal extent, or only local, is not fully decided. So small a part of the earth's surface has been thoroughly examined, that a decision on this point would be premature. It is the more general opinion, however, that the series of formations is not identically the same in all countries, but equivalent; i. e. that some member of all the great classes of formations may be found in every series, from the lowest to the highest strata; and that where a member prevailing in one country, is deficient in another, some allied member is increased so as to supply the deficiency. Great Britain, particularly England and Wales, France, Germany, and Switzerland, and some of the adjoining districts, have been minutely examined, and in these countries the order of superposition may be considered as pretty well established. The tables of Messrs. Conybeare and Phillips, and a synoptical table of *formations* by A. Bouc, M. D. (Edin. Phil. Journ. xxv.) have furnished materials for the following arrangement:

I. Primitive Rocks, crystalline, without organic remains.
Stratified Rocks.
1. Gneiss formation, containing as subordinate members, hornblende rocks, primitive limestone, and quartz rock.
2. Mica-slate formation. Subordinate members, hornblende rocks, limestone, quartz rock, and primitive gypsum.
Unstratified rocks interposed.
1. Granite rocks, in domes, beds, and veins.
2. Sienite.
3. Greenstone.
4. Serpentine rocks.
5. Porphyritic and basaltic veins.

II. Transition rocks, passing from the crystalline structure of the primitive, to the earthy and fragmentary structure of the secondary. Organic remains rare.
Stratified rocks.
1. Clay-slate formation, including subordinate strata of mica-slate and gneiss, talc and chlorite slates, and quartz rock, with beds of limestone and gypsum.
Fossils very rare, zoophytes, crustacea, trilobites, &c.—monocotyledonous plants.
Upper limit of uranium and tantalium.
2. Graywacke formation, including subordinate strata of clay-slate, anthracite slate, and limestone. Fossils as in the former, but more abundant;—principal seat of anthracite coal.
3. Old red sand-stone. Fossils rare, shells and vegetable impressions;—short beds of impure coal.
4. Mountain limestone (metalliferous limestone,) extremely cavern-

their base, quartz, mica, and feldspar, and are distinguished by the name of *granite*. Sometimes a fourth substance, *amphibole*, is mixed with it, or replaces the mica, or the quartz. Granite has even been found mixed with a little lime; but it is always siliceous substances, especially feldspar, which predominate in its composition. The agreeable variety of colours which the feldspar reflects, the lustre of the mica, the whiteness of the quartz, the sombre green of the amphibole, often impart to granite the most magnificent appearance, especially when polishing has developed their natural shades; thus the eye contemplates with delight the *rose-*

ous, imbedding nodules of hornstone; abounding in metals, particularly copper, iron, and zinc. Fossils; vertebral animals rare; corals and testacea numerous.

Unstratified rocks.

Granite, sienite, greenstone, diallage and augite rocks, serpentine rocks—porphyries, trapp rocks,—porphyry and trapp breccias.

Upper limit of native gold *in situ*, tin, bismuth, antimony, tungsten, arsenic, and auriferous pyrites.

III. Secondary or flœtz rocks.

1. Coal formation, consisting of various strata of sand-stone, slate-clay, and bituminous slate (shale,) imbedding coal and limestone—only deposite of the true caking or bituminous coal.

Fossils; abundance of vegetable remains, mostly monocotyledonous, particularly ferns;—fresh water bivalves, no marine shells;—fishes.

Unstratified rocks; porphyries and trapp rocks, porphyry and trapp breccias. Last limit of cobalt, and crystallized gray manganese ore.

Boué introduces here a red sand-stone formation, called in Germany Todt liegendes (dead layer.) It is not included in the arrangement of Conybeare and Phillips. It includes the lower red conglomerate of the Vosges and Thuringia, and the marly whitish sand-stone, or copper sand-stone of Thuringia.

2. Magnesian limestone (first flœtz limestone, Werner.—Zechstein, Alpine limestone,) including bituminous marl slate, and copper slate, zechstein and gypsum, in Germany and France; the magnesian limestone of England, between the coal measures and red marl; the magnesian limestone of the Alps, with blackish marls and dolomites, &c.

Fossils not numerous; shells in the limestone; fishes and vegetable impressions in the marl slates; marine fossils rare; upper limit of G. Productus.

Unstratified rocks.

Trapp and augite rocks; breccias.

Upper limit of mercury and nickel.

3. New red sand-stone (saliferous or variegated sand-stone; 2d flœtz sand-stone, Werner; red marl,) including the variegated sand-stones and marls of Germany, imbedding gypsum and salt, limestone, argillaceous iron ore and lignite; the red marl of England, with gypsum and salt beds; the marly sand-stone of the Alps, with black and yellow limestone, coarse conglomerate, gypsum, salt and lignite. This probably occupies the great saline deserts of Africa, Asia, and central N. America, and is probably the most extensive of all the recent formations; it every where abounds in salt springs and salines.

Fossils. Terrestrial monocotyledons, and some dicotyledons; many marine plants; testacea and corallines, only in the upper strata. According to Conybeare and Phillips, it is almost entirely destitute of organic remains.

Unstratified rocks. Amygdaloidal trapp, (Conybeare;) tertiary basalt (Boué.)

This formation, in England, is immediately succeeded by the Lias. On the continent two other formations intervene.

4. Shell limestone (muschel kalk; second flœtz limestone, Werner.) It includes the globular limestone of Germany and France; gray limestone, with encrinites, of Salzburg; reddish, with hornstone, of the Carpathians; compact, with vegetable impressions, of Recoaro (Italy;) blackish, with nodules of galena and calamine, of the Vicentin.

Fossils, numerous; cetacea, plesiosaurus (amphibia.) First appearance of belemnites and echinites.

Unstratified rocks, tertiary basalt, and augite porphyry.

5. Quader sand-stone (white sand-stone; third flœtz sand-stone, Werner,) including conglomerates, potter's clay, gypsum, and siliceous marl, with vegetable impressions and seeds; and imbedding lignite with fossil resin, hydrate of iron, nodules of heavy spar, lead glance and malachite. Upper limit of carbonate of copper. Fossils; marine fossils; monocotyledons and dicotyledons, rarely ferns. Unstratified rocks, basalt, in veins.

6. Jura limestone (third flœtz limestone, Werner; lias and oolite series, Conybeare,) including the gryphite and oolitic limestones, the slaty limestone with fishes and crustacea, and the clay marl with pea iron ore, of Germany; the gryphite limestone or *pierre bleue*, and madrepore limestone, of France; the lias, and the upper, middle and lower oolites, (Purbeck and Portland stones, coral rag, Oxford clay, cornbrash, Stonesfield slate, forest marble, fuller's earth, &c.) of England; the lias and sand-stone with lignites, of the northern Alps; the oolite and nummulite limestones of Istria, &c.; it imbeds lignite, gypsum, sulphate of strontian, iron ore, &c.

Fossils. Many marine fossils, accumulated in particular spots or layers; first nummulite deposites; crustacea, amphibia, terrestrial mammalia (didelphis, with birds and insects, in the Stonesfield slate,) ferns, flags, &c. The amphibia resemble the lacertæ, and are of immense size, probably marine, (Ichthyosaurus, Plesiosaurus, &c.)

Unstratified rocks, augite porphyry, metalliferous;—granite with schorl, (Tyrol and Vicentin;) basalt and tuff.

7. Iron and green sand, including the iron sand-stone, with clay and iron ore, and the green sand with fossil resin, of Germany; the iron sand, with iron ore and siliceous wood, of France; the iron sand, weald clay, and green sand, of England, &c. It imbeds iron ore, lignite, &c.

Fossils, numerous, particularly in the green sand. Monocotyledons, (particularly ferns in the iron sand,) and dicotyledons; fossil resin; echini, testacea, very numerous in the green sand.

Unstratified rocks, basalt, and basaltic tuff.

8. Chalk formation, including the chloritic chalk, chalk marl and earthy chalk of the continent; the chalk and chalk marl of England; the compact white limestone of Poland and Russia; the coral and nummulite limestone of the Alps. It imbeds great masses of flints, particularly in the earthy chalk; gypsum, iron pyrites, galena, &c. in the chalk marl.

Fossils. This is the line of distinction between the remains of living and extinct species; none found in the chalk or below, having been observed in a living state. All its fossils marine; sharks, testacea, zoophytes, particularly echinites, sponges, and in the chalk marl, fishes and wood—mastodon and cervus (Boué?)

Unstratified rocks; augite porphyry, basalt, and basaltic tuff.

Upper limit of galena? (the galena of the Upper Mississippi is imbedded in loose earth.)

Chalk has not been found beyond the limits of Europe.

IV. Tertiary rocks, including all above the chalk. These are probably local deposites, occupying basins above the chalk, and when that is wanting, above some equivalent formation. The chalk forms the outline of an immense basin, extending from the centre of England and France, through Belgium, N. Germany, Silesia, and S. Poland, into Russia, probably beyond the Volga, (it is found on that river below Kasan.) On the North, it crosses the S. of Denmark and Sweden. The greater part of this basin is covered by a deep bed of sand and gravel, and the tertiary formations have not been distinctly traced; but the two English basins of London and the Isle of Wight, and the great Paris basin, have been minutely examined, and the exact order of their strata ascertained. There are other basins in the S. of France, at Nice, Perpignan, at the mouth of the Rhone, and particularly the great basin of the Garonne; on the Rhine and Mayn, and around the lake of Constance, &c. Another extends along the Danube through Moravia, Hungary, and Transylvania. Another occupies the valley of the Po, and extends along the shore of the Adriatic to Otranto; another the valley of the Arno; and many others lie along the west of Italy, partly covered by extinct volcanos. Another, very extensive, occupies the S. of Sicily, the opposite coast of Tunis and the intervening islands. Probably there are others in Spain, Greece, Asia Minor, &c.—The immense tract extending along the Atlantic coast of the U. States, from Cape Cod to the Gulf of Mexico and the Mississippi, is probably a tertiary basin. These basins do not all rest on chalk; the latter basin approaching near, if not immediately resting on the primitive.

Boué has generalized the formations of these basins, as follows:

1. First tertiary sand-stone (molasse, plastic clay and sand,) including the nagelfluh of Switzerland, and imbedding lignite, amber, mellite, sulphur, bitumen, and semi-opals (in Moravia.)

Fossils. Insects, fishes, fresh and salt water shells intermingled, not numerous—also vegetables, and it is said, fossil bones.

Unstratified rocks, trachytes, clinkstone, augite porphyry, basalts, and their conglomerates. These rocks abound in zeolites, opals, &c. Lower limit of leucite, (Boué.)

2. First tertiary limestone (coarse limestone, calcaire grossier,) including sand and clay beds, and marls, and imbedding lignite. The London clay, or blue clay, found also in Hungary and Italy, is arranged here.

Fossils. Fresh and salt water shells abundant, particularly in the upper strata; in the London clay very various and abundant: amphibia, fishes, crustacea, testacea abundant, zoophytes rare, charred wood and numerous seed vessels.

Unstratified rocks; basalt; basaltic, trachytic, and pumice conglomerates.

3. First fresh water formation; including the siliceous limestone of the Paris basin, covered by beds of gypsum containing the bones of quadrupeds, among which are several extinct genera (anoplotherium, paleotherium, &c.)

Fossils. Fresh water shells, siliceous wood; marine shells in the lower bed of gypsum, fishes in the middle, mammalia and fresh water shells in the upper.

4. Second tertiary arenaceous and calcareous formation (upper ma-

granite of Egypt, composed of feldspar and mica ;[a] the *antique basalt*, or black granite, in which the amphibole conceals the transparent laminæ of the feldspar ;[b] the *orbicular granite* of Corn, formed by a singular species of crystallization, which has united in one mass of white feldspar, and of amphibole of a blackish green, distinct balls of the same substance ;[c] lastly, the *graphic granite* of Siberia and Scotland, the elements of which, disposed in broken lines, suggest the idea of Hebrew or Runic characters.[d] *Granite* appears to be the most ancient of the rocks, and to constitute the base of the primitive earth. It is not improbable, that it forms an immense vault around the globe ; we know, at least, that granite is every where found beneath all the other rocks, and that of the highest mountains in the principal chains of the world, it is granite which constitutes the foundations and the mass. The crystallization, which has united the substances of granite, must have occasionally met with one or other of them in excess ; it has accordingly formed *felspathic*, *micaceous*, and *quartzeous* rocks. These are rarely found pure. There appears, however, to have been a very peculiar formation of pure quartz ; strong veins of it are seen traversing even the granite mountains, and the vast wall of quartz upon the mountain of Felsberg, near Manheim, excites the wonder of the naturalist.[e] But to the admiration of these phenomena succeeds the spirit of disputes, classifications, and nomenclatures. It is often impossible to discover the facts in the midst of the geological discussion to which they have given rise. The rock which most nearly resembles granite, unites to the granulated structure of the latter an arrangement of parts, which gives it a foliated appearance ; the quartz and feldspar are found there in grains, but the mica forms bands, or very thin layers, in which the two other substances are contained. This is the *micaceous rock* of Haüy, the *gneiss* of Werner, and the foliated rock of Saussure ;[f] but frequently talc, or even argil, supplies the place of mica in these foliated rocks, a circumstance occasioning continual mistakes. There are some mineralogists who give to the name of *gneiss*, an extension which renders all definition impossible.

The *micaceous schists* are rocks which occur in great laminæ, composed of quartz and mica. It appears that they recede by imperceptible gradations from the granulated texture of granites, and that they become more and more mixed with alumina or argillaceous earth, an earth, the presence of which seems to prevent crystallization from taking place.

The *argillaceous schists*, in which alumina or argillaceous earth predominates over the silex, occur in the form of large unbroken laminæ ; a circumstance which constitutes what we call the *schistous structure*. These imperceptible transitions from one kind of aggregation to another, render all classifications uncertain. No one has yet been able precisely to determine the four or five kinds of rocks, to which the names of *horny schists* and of *wacke*[g] are given ; they are merely combinations of silex and alumina, with a little lime and iron. The horny texture is found in part in certain rocks, composed as it were of a paste, in which masses of a more perfect crystallization are imbedded. These are the *porphyries*, rocks which baffle more than any other kind the zeal of classifiers.[h] Sometimes it is the paste which is not homogeneous, and sometimes the imbedded crystals are of different species. The porphyries, properly so called, are masses of compact feldspar, coloured by a metallic oxide, and containing crystals of the same kind. Such is the superb *red antique porphyry*, originally from Egypt, and of which only imperfect varieties are to be found in Europe. Such is also the *ophites*, or *serpentine antique porphyry*, although chequered with plates of amphibole ; a substance which abounds more and more in black porphyries. All the real porphyries commonly found in the vicinity of granite, are distinguished from it only by that pasty substance which serves as their base ; but they differ also from *pudding-stones*, or conglobated rocks, by the perfect crystallization of this paste or cement.[i] One may easily conceive how difficult it is to fix the innumerable shades which occur in the crystallization of these rocks ; it is this which has led geologists to create a class of *porphyroidal rocks*. The disorder, or rather the capricious order, according to which the particles of these rocks have crystallized, sometimes occasions the most brilliant and fanciful appearances. Who would not admire the *orbicular porphyry* of Corsica,[k] which, on being polished, displays circles composed of little yellowish red leaves, arranged in rays around a reddish brown kernel, and which presents to the eye a transverse section of some unknown and delicious fruit ?

Trapp[l] is composed nearly of the same substances as porphyry. They are united in the same proportions, only iron abounds more in trapp ; but their arrangement in small grains, united sometimes by a cement, does not

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rine,) containing beds of marl, sand and sand-stone, imbedding nodules of hydrated iron, flint, hornstone, &c.

Fossils, abundant in the marl, particularly oysters ; rare in the sand-stone ; all marine.

Upper limit of oxyd of manganese.

5. Upper fresh water formation, consisting of sand, marls, burhstone, and limestone containing flint and beds of burhstone, the last lying uppermost.—Fossils, land and fresh water shells.

These terminate the series of regular and consolidated strata. Above them lie loose beds of rolled stones, gravel, and sand, which have been termed DILUVIUM, by the English geologists, from their supposed diluvial origin. These beds contain shells and bones of extinct and living animals, but none of the human race. Similar bones are also found in beds of clay and marl, formed by the sediment of lakes, or the ocean.

The proper alluvial beds, the washings of the sea and rivers, the weathering of rocks and unconsolidated strata, &c. ; with the stony deposites from springs, lakes, &c., and the formation of vegetable earth in bogs and marshes, need no arrangement. The same may be said of the effects of volcanos, their lavas, tufas, and ashes.

This arrangement, derived from the examination of European formations, has never been critically applied to those of the United States. There is probably, in this country, a greater simplicity in the arrangement, and a smaller number of members in the series : but what is here wanting in number, is made up by the immense extent of individual formations, such as the primitive, the coal, the red marl, and the horizontal limestone.—P.

[a] Dolomieu, Journal de Physique, Ventose, an. ii. tome i. p. 196.

[b] Id. ibid. Septembre 1792, p. 3.

[c] Faujas Saint-Fond, Essais de Géologie, ii. 182.

[d] Patrin. Hist. Natur. des Miner. i. 101, Faujas, l. c.

[e] Faujas, l. c. p. 94.

[f] Saussure, Voyages, § 1359, 1679, &c. Haüy Minéralogie, iv 432.

[g] Comp. Delamétherie, Théorie de la Terre, ii. p. 337—380. Werner, cited by Saussure, Voyages, § 1304.

[h] Comp. Haüy, iv. 435. Faujas St.-Fond, Essais, ii. 213, &c.

[i] Saussure, Voyages, § 149, *sqq*.

[k] Faujas St.-Fond, Essais de Géologie, ii. 245, and plat xx. bis.

[l] A name derived from the Swedish *trapp*, a stair or ladder. Saxum trapezium, Waller. sp. 220.

present the shining crystallization of granite and porphyry.[a] Trapp rocks have a tendency to separate and subdivide into rhomboidal fragments, resembling the steps of a staircase, which often gives them the appearance of rocks called *basalt*, by the moderns. The celebrated Werner, indeed, considers these two kinds of rocks as the same, and comprehends them under the name of *primitive trapp;* an opinion which, at present, seems to be received only in the school of that mineralogist.

The rocks of *petrosilex* and of *jade*, as well as that composed of amphibole and mica,[b] which Werner names *grünstein*, that is, greenstone, form small varieties, resembling trapps and porphyries in their relative positions, although the amphibole rock, among others, often has the crystallized texture of granite.[c]

Of all the elementary earths, the calcareous, and, next to it the magnesian, have the least contributed to form crystallized rocks. The *primitive limestone*, or that in which there is not a vestige of animal remains, is not very extensively distributed; it is rarely found among the foliated granites, and the micaceous schists; the calcareous beds, in the argillaceous schists, have a texture less perfectly granulated, and present a compact or lamellated fracture.[d] It is among the stratified rocks that limestone shows itself in abundance; it is at the head of these aggregations, as granite is at the head of rocks purely crystallized.

Magnesian earth appears to predominate in the *talc* rocks, whether compact or schistous, in the *serpentine*, the *ollaire* or *potstone*, *steatite* or soapstone, and some other aggregations, which, in truth, often occur in the primordial mountains; but which form in general only small subordinate masses. There are rocks of serpentine, however, which rise to a very great height.[e] May we not imagine that the alkaline particles, existing in feldspar, one of the elements of granite, may be separated from it to form a series of insulated rocks? It is at least very remarkable, that magnesian earth seems in a manner to close the march of pure crystallization, and to disappear with the primordial rocks, not to show itself again either in stratified mountains, or in accumulations, but only in the waters of the ocean.[f]

We ought to pause a little to consider these crystallized aggregations, which seem to have preceded the birth of our mountains, of which they form the most solid part. We leave, however, to the naturalists by profession, the task of classifying the innumerable modifications of aggregate substances, which we have named *conglobated rocks*. We may conceive, that the circuit of the globe, scarcely consolidated in the bosom of primitive chaos, must soon after its formation have begun to waste away. The action of different elements, probably the rapid alternations from excessive heat to intense cold, and even the very weight of the masses themselves, but recently crystallized, could not fail to produce ruptures and downfalls, and consequently fragments, which, in reuniting by the crystallization of the fluid substances which surrounded them, have given birth to some of the rocks termed *breccias* and *pudding-stones*. These rocks differ from porphyries, in this, that they are composed of fragments of other masses already crystallized, while porphyry consists of crystals which have been formed in the midst of the cement which unites them;[g] hence the cement of porphyry should be designated only under the name of basis. The conglobated rocks differ from sand-stone (*grès*) in as much as they contain larger grains, or do not present regular homogeneous beds, or a foliated structure.

Custom appears to have appropriated the word breccia (*brèche*,) borrowed from the Italian, to aggregations of fragments of calcareous rock, while the term *pudding-stone*, for which the more classical appellation *allatoides* may be substituted,[h] appears to be reserved for rocks formed by the reunion of a great number of small *flints*.[i] It would be better to call breccias, aggregations of angular fragments, and pudding-stones, those of rounded fragments, which probably have been rolled by the waters.[k] The etymology even of the term in Italian, *Breccia*, borrowed from the Goths or Lombards,[l] indicates a violent fracture.

We may easily imagine, that these assemblages would vary in a thousand ways, either with respect to the nature of the reunited fragments, or of the cement which unites them. Of all the substances, however, which serve to conglutinate the fragments of primitive rocks, it is quartz, or siliceous earth, which is most abundant, and of most frequent occurrence. This element, which appears coexistent with our globe, may be considered as the source of all crystallized formation. Sometimes the breccias, in their turn, have been reduced to fragments, which, agglutinated by a new cement, have produced breccias composed anew, which have been called *double breccias*.

We place next to these breccias, and among the conglobated rocks, those which the naturalists have called *Amygdaloids*, from their similarity to almonds imbedded in paste. The amygdaloids are composed of any paste whatever, in which are found knots or glands of the same substance, or of another. The whole is united by a confused crystallization; sometimes the spaces occupied by the knots, are found empty, the substance which once filled them having been destroyed by an unknown cause; this makes the amygdaloid resemble porous lava. It is extremely difficult to distinguish the amygdaloids from certain varieties of porphyry.

Without involving ourselves in the discussions to which the formation of conglobated beds has given rise, let us proceed to the examination of *stratified rocks*. In order to show how vague are the limits between the products

[a] Saussure, Voyages, § 145.

[b] Greenstone, the *grünstein* of Werner, is essentially composed of hornblende (amphibole) and feldspar. Epidote, mica, pyrites, &c. which often occur in it, are considered as accidental ingredients.—P.

[c] The amphibole rock, in the text, is probably the sienite, which like greenstone, is a compound of feldspar and hornblende. It is often coarse-grained, and then resembles granite imbedding hornblende.—P.

[d] Werner, cited by Steffens, l. c. 21.

[e] Saussure, Voyages, § 19. Faujas, Essais, ii.

[f] Magnesia, in the form of magnesite, a variable compound of magnesia, silex, carbonic acid, &c. is found in the more recent formations. It occurs in beds at Vallecas, Spain, along with flints and cacholong: and in the tertiary formations of the Paris basin. The keffekil, a variety, is found in veins in compact limestone.—P.

[g] Saussure, Voyages, § 149.

[h] From the Greek word *αλλᾶς*, genitive *αλλαντος*, pudding. (The genitive of *αλλᾶς* is *αλλαντος*, T.)

[i] Saussure, § 197. Romé de l'Isle, Cristallographie, ii. 573.

[k] Delamétherie, Théorie, § 531. Comp. Haüy, iv. 463.

[l] From the verb *brechen*, Germ. *brekke*, Dan *briser*, *rompre*, French, to break, Eng.

of pure crystallization and those of stratification, let us be permitted to have recourse for a moment to an hypothesis borrowed from chemistry.

The elements of which the rocks are formed, were undoubtedly once in a fluid state; this condition is necessary to render the aggregation of so many different substances possible. But the state of solution in which these substances existed, presented two modifications.

Chemical solution differs essentially from *mechanical solution;* the latter exists when the integral particles of a body are separated one from the other, and suspended in a fluid; on being deposited according to their specific gravity, they form a *sediment;* on the contrary, by chemical solution, the integral particles are not only separated from one another, but are combined with the solvent; and in uniting, according to a new development of affinities, independently of their specific gravity, they afford a *precipitate.* Every crystallized substance is formed by chemical solution, and by precipitation; this character belongs, in the whole force of the term, to primordial rocks; but we have seen how crystallization lost by degrees its simplicity, and, if we may use the expression, its primitive energy. We have also seen how the crystallized texture has been succeeded by the foliated and the compact structure, which, in becoming larger and larger, seems to indicate a regular scale of chemical precipitations, gradually approaching to the nature of mechanical sediments. There can be no doubt, that the most immense of all fluids, the ocean, suffered a gradual decrease of its waters; the primordial mountains first reared their summits, then the earth began to swell up out of its chaotic state. Organic beings were then in existence; these were marine animals. The chemical precipitation continued, but, at the same time, the first mechanical sediments began to be deposited; the two precipitates were mixed, sometimes in great confusion, together.

Thus arose the *rocks* of *transition*, which are found on the sides of the primordial mountains, and sometimes at their base, in which we observe the first animal remains. The waters having gradually subsided, the globe from a shapeless chaos, took the appearance of one vast sea, from which there arose on all sides, the primordial mountains, flanked by rocks of transition.

This is the Neptunian age, the second geological era. The sediments of the mechanical solutions alternated with the chemical precipitations; the solvent having gradually lost its original power, chemical action insensibly gave way to that which was purely mechanical. This Neptunian age gave birth to *stratified* mountains and rocks, understanding by the word *stratum* a bed of homogeneous substance. This term, borrowed from the Latin, is not then precisely synonymous with *bed* or *layer;* a stratum differs still more from a *lamina* or *plate*, terms made use of in speaking of the texture, which the substance of certain rocks presents, even in their minutest fragments.

The hypothesis we have just now traced, exhibits the difficulties which geologists have met with in their attempts to classify stratiform rocks. In the *calcareous rocks* especially, the compact structure and the stratified are blended together by innumerable shades. Even in the same rock, and notwithstanding its being completely homogeneous, we find the upper part containing petrifactions belonging to marine animals, while the lower beds are entirely free from them; but among the decidedly stratified rocks, we should place nearly all the aggregates of sulphate and carbonate of lime, known under the name of *gypsum;*[a] then the *secondary marbles*, which owe their earthy fracture to large quantities of argil, and their colours so agreeably varied to the presence of oxide of iron; *ruiniform marble*, which, according to Dolomieu, was a calcareous argillaceous stone, uniformly coloured, but while drying cracked into fissures; and these, filled by the transuding of the calcareous matter, have formed the appearances of ruins and landscapes, which are so much admired;[b] lastly, the *shell marble*,[c] composed of an infinity of small shells united by a calcareous cement. The *fœtid stone*, or *swine stone*, which in Norway forms of itself a little island, is only carbonate of lime, penetrated by bitumen.[d] Calcareous substances predominate in the stratified rocks: the capital of France, with its palaces and temples, is built of calcareous stone, almost entirely composed of two kinds of shells; the cerite (cerithium,) which forms the upper masses, and the miliolite (miliola,) which abounds in the deepest beds.[e] These rocks readily indicate the rank which belongs to them; but what rank can be assigned to the calcareous stone which presents itself under the form of *chalk*, and which occupies such vast belts throughout the globe?[f] From its purity, it is almost a simple substance, containing only lime, carbonic acid, and phosphoric acid. From the small number of marine animals which it *immediately* contains, it resembles the primitive rocks from which its earthy consistence, destitute of the least appearance of crystallization, seems to keep it perfectly distinct; finally, the layers of coarse flint so frequently met with among beds of chalk, clearly indicate that they have been formed by deposite, and these layers enclose a great many marine animals of species which no longer exist.[g] It appears that the chalky state of the calcareous matter is owing to some particular causes, to investigate which is the province of chemistry.

Aluminous earth enters into a great number of stratified substances; *clay*, which occupies great spaces on our globe, is properly a mixture of silex and alumina, modified by the accidental presence of magnesia, iron,

[a] "*Pierre à plâtre*," plaster of Paris, gypsum.—P.

[b] Dolomieu, Journal de Physique, Octobre 1793, p. 285, et suiv.

[c] Lumachella, Ital.—P.

[d] The swinestone is not a proper bituminous limestone, though it is often a little bituminous. It owes its fœtid odour to sulphuretted hydrogen.—P.

[e] Lamarck, Mémoires sur les Fossiles des Environs de Paris. *Annal. du Muséum d'Hist. Natur.*

[f] Chalk appears to be confined, with a few exceptions, to the skirts of the great tertiary basin of central Europe, (see note b, p. 87.) It there occupies immense tracts, particularly in S. E. England, N. France, Poland, and Russia, at its E. and W. extremities. It is found also in Antrim, Ireland, in connexion with basalt. Some of the limestones in the basin of the Garonne, (which, however, is connected with the great basin by a secondary strait, between the basaltic mountains of Auvergne and the primitive formation in La Vendée,) at the *Perte du Rhone*, and in the Alps of Savoy, have been referred to the chalk formation, by Brongniart, from their imbedded fossils, though their structure is compact. It is not certainly known that any true chalk is found out of the above limits; that of Sicily is a tertiary limestone.—P.

[g] Comp. Brongniart, Traité de Minéralogie, i. 208—210.

and other substances Clay is found in the state of earth and in *rocks*; it seems natural to us to suppose in general, that these last may be formed by the hardening, or rather by the confused crystallization of argillaceous earths, mixed sometimes with grains of quartz. But argillaceous earths may be formed also by the decomposition of rocks; such would be, according to Werner, the origin of potter's earth, which he places among the ternary earths or those of alluvion. All argillaceous soils have, without doubt, often changed their situation, their layers gliding easily one over another; their principal situation, however, is in the secondary rocks; they are found alternately with sand-stone, sand, and shell limestone.

Lithomarge, distinguished by its feeling greasy, and adhering to the tongue, by the fineness of its grain, and by its fusibility into a spungy mass, is the only clay which is found in the clefts of rocks in primitive formations. This is the substance to which several nations of America, Africa, and Siberia, have recourse to appease their hunger, or rather to beguile for a moment the cravings of their digestive organs.[a] Among the other kinds of clay, we distinguish for their utility those employed in the operations of the potter and the fuller, the different boles and ochres; the slate, which is of such service in roofing houses, and which is only indurated clay, in the form of schist or in laminæ. Slate, which is discovered in great blocks, has so foliated a texture, that the workmen needs not exert any attention to catch the joints of its laminæ; wherever he places his chisel, he is sure of hitting a division. A quality common to all clays, is that of furnishing subterraneous reservoirs to fountains and springs; the best water is always found in argillaceous soils.

Fermenting clay forms an exception: as it is mixed with quartz sand reduced to fine powder, it imbibes water, swells up, and raises with great force houses, masses of rock, and whole fields; when the clay is dried, they sink down to their first level. The consequences of these unlooked-for throbs and heavings of the soil are very formidable in Sweden, and in Russia, especially when the clay in swelling happens to freeze at the same time.[b] Such devastations, arising from a cause apparently so weak, will assist us in conceiving of the revolutions which similar fermentations probably accomplished at the epoch when mountains were formed.

Marl is a clay united to a greater or less quantity of calcareous earth, often with quartzy sand, and sometimes so impregnated with bitumen, as to take fire of itself.[c]

Siliceous substances are also deposited in beds. *Sand-stone*[d] is composed of small grains of quartz agglutinated by a clayey, calcareous, or siliceous cement. It is the most common of all the stratified rocks. It forms the ordinary transition between the primitive and secondary mountains; in this situation it is found in parallel strata, and is but little mixed with heterogeneous substances. But it is met with also at a distance from the primitive mountains, and seems to have been formed at all the geological periods.

There is, as appears to us, a very sensible gradation in the different formations of "grès" or sand-stone, from the *glossy* kind, which nearly approaches primitive quartz, to the *pulviscular* species, in which the granulated structure becomes perceptible only by exposure to heat.

The *recomposed granite*, or the *sand-stone* (*grès*) *of the coal mines*, is an aggregate of minute fragments of the ancient granite rock, united by cement of any kind, and sometimes so exactly resembling the texture of ancient granite, as to deceive naturalists themselves. But as the beds of these secondary granites alternate with those of coal, it is evident that they have a much more recent origin than the rocks of whose wrecks they are composed.

We are tempted to refer to this epoch, the enormous blocks of friable granite with which the marshes of Finland are covered, and from among which they have chosen the rock that serves as the base to the statue of Peter the Great. This granite, named *rapakivi*, in the language of the Finns, forms no mountains nor contiguous strata; it is decomposed very slowly.[e]

The formation of porphyries is continued through the period of stratification; it has principally produced jaspers and quartz-agates.

The decomposition of stratified rocks, and the reunion of their fragments, or of those even of the most ancient rocks, by a stratified gluten or cement, forms what we call the *conglomerated rocks*. This formation appears to extend through a variety of periods, and to present a long series of shades which it is almost impossible to define. The *breccias*, and *pudding-stones*, composed of sand-stone, jasper, shell marble, and others which belong to this class, are often confounded with the breccias and pudding-stones composed of parts of crystallized rocks. The countries which have been most carefully examined with this view, namely, Thuringia and Silesia, present no other constant rule than the identity of the conglomerated fragments with the rocks, either crystallized or stratified, which border upon them. The *red dead lier*[f] of Thuringia is a foliated breccia of sandy quartz, in which are found granite, porphyry, and schists, according as the neighbouring mountains contain them.[g] In Silesia *conglomerate rocks* accompanying the primordial mountains, vanish when they disappear, and contain only fragments analagous to the stones which compose them.[h] At the foot of Mount Altai, in Siberia, we find whole mountains of quartz and jasper in small fragments conglomerated by a cement sometimes quartzeous, and sometimes argillaceous.[i] In Chili, enormous masses of pebbles reunited by a black clay, rest upon the most elevated of the Cordilleras.[k] How are we to trace the innumerable formations which have successively produced these beds of broken remains spread over the whole surface of the globe?

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[a] Humboldt, Tableaux de la Nature, ii. 191. Georgi, Description de la Russie, iii. 202, *sqq.*

[b] Waller, Minéralogie, i. p. 34. Georgi, Russie, iii. 201.

[c] Guldenstedt, Voyage dans le Caucase.

[d] Wherever the word "grès" is met with, it is best translated by the word "sand-stone."—T.

[e] Bergmann, Géograph. Physique, i. 214. Comp. Patrin, Dictionnaire d'Histoire Naturelle, de Déterville, x. 81, au mot *Granit d'Ingrie.*

[f] "*Rouge mort*," Fr.; *rothe todte liegende*, Germ.; a variety of red sand-stone.—P.

[g] Heim, Correspondance de Zach, vi. 535.

[h] Léopold Buch, Description Géognostique de Landeck, p. 19. Id Observations Géognostiques, vol. i. passim.

[i] Schangin, dans le Journal des Mineurs. (Bergmannisches Journal,) 1791, vol. i. p. 83, 89.

[k] Molina, Histoire Naturelle du Chili, p. 83. (trad. All.)

We have not been able to comprehend in any of the preceding classes, a species of rock which is evidently formed by an operation different at the same time both from crystallization and stratification. We allude to the celebrated *basalt*, which has been the subject of so many discussions among geologists, and which has made them split, as it were, into two churches, each attached to its particular opinions with all the keenness of theological zeal.

These rocks, compact or porous, assuming prismatic or globular forms, or without any definite form, black, brown, grayish, and bluish, resemble in their texture corneous or horny rocks, and those which Werner designates *primitive trapps*. Silex and iron appear to be the principal chemical elements of basalt. So are they equally of trapp, but exposed to strong heat, the trapp affords a glass of a greenish transparency, whilst that of basalt is black and opaque. Besides, the basalt encloses crystals of "peridote," which are not found in the trapps.[a] The most striking character of basaltic rocks is their configuration. Nothing of this kind is more celebrated than those prismatic columns, of an immense height and thickness, of which the cave of Fingal in the island of Staffa is composed.

On the coast of Ireland, is another admirable collection of basaltic rocks, placed horizontally, and forming together what is called the Giants' Causeway.[b] Masses of a similar description, though less considerable in size, are to be seen in Iceland, and are called in that country the Walls of the Devil. It has been remarked, particularly in the cave of Fingal, that though the faces of the same prism are unequal, they are each of them equal to the corresponding faces of the adjacent prisms; that the inequalities which are in relief upon the faces of one of the prisms, are adapted to the depressions or little concavities, on the corresponding faces of the adjoining prisms, as if the one was moulded into the other; lastly, it is worthy of notice, that in the island of Staffa, where the prisms are raised one upon another, like the blocks of columns, the convex base of the one is inserted into the concave summit of the other; so that the columns appear to be articulated. Even when the basaltic rocks present themselves under a less regular structure, their position alone is sufficient to attract the particular attention of the naturalist. Those masses which cover, indistinctly, granite, gneiss, the primitive and secondary schists; those summits, which, sometimes conical, sometimes pyramidal, shoot up, in an insulated form, above rocks of a totally different nature; the links which unite the basalts to various crystallized rocks; the successive transition of argillaceous siliceous schist to basalt, and from basalt to that kind of amphibolic rock, named *greenstone;* lastly, the numerous instances of the disintegration and decomposition of basalt itself, imparting fertility to the soil of the earth;—these are facts, the explanation of which, has for many years exercised and baffled the ingenuity of geologists.

The *vulcanists*, with Desmarets, Faujas Saint-Fond, and Dolomieu at their head, regard basalt as lava melted by the heat of a volcano, and which, while slowly cooling, has acquired by contracting those prismatic forms by which it is distinguished.[c] But this explanation labours under great difficulties. We ask the vulcanists, Why these supposed lavas have an appearance similar to rocks, the aquatic formation of which is generally admitted? Why do they present no trace, either of vitrification, or of tumefaction? Why do they envelop unaltered crystals, and other substances which must have entered into fusion? Dolomieu answers, that the heat which melted these basaltic lavas, had very little intensity; that the fusion of these substances was only a simple dilatation, which, in separating the particles, allowed them merely to glide one over another, without, in any degree, changing their nature. He supports this opinion by his own observations; according to which, the ordinary lava, even while it is flowing, is sufficiently firm and cool on its surface to admit of being walked upon without much inconvenience.[d]

A multitude of other facts, however, seem to leave no subterfuge to the vulcanists. In the first place, the basaltic cones, placed above all kinds of ancient and secondary rocks, and often forming the most elevated summits of chains of mountains, present, from their situation, from their entire structure, and from the absence of craters, characters very contrary to those of lavas and volcanic accumulations. Basalt is decomposed daily, which happens to no species of lava.[e] In Ringuerike, in Norway, the soil appears almost throughout entirely to consist of decomposed basalt. Near Christiana, small fragments of this rock are spread over the fields, under the conviction, that it will form an earth proper for cultivation.[f] If we examine the texture of these rocks, we find it very sensibly approach that of the schistous porphyries and greenstone. Upon the Meisner in Hesse, they have observed, with a great deal of attention, the transition of basalt into greenstone.[g] The third fact, which is inconsistent with the volcanic origin of basalt, is its relative position in regard to coals. Not only in Hesse does basalt cover an immense bed of coals, but in Sudoroe, one of the Feroe Islands, a mine of coal is seen in the midst of the basalt.[h] It is evident that these masses of coals would have changed their nature considerably, if the lava in melting had flowed around them.[i]

The Neptunian origin of basalt appears to be attended with much probability. Bergmann, who was the first to prove by analysis the identity of trapp with basalt, is content with supposing, "that the substance of basalt, penetrated and softened by humid vapours, was converted into a clammy and liquid mass; that this mass having, in the progress of drying, suffered contraction, but

[a] Faujas Saint-Fond, Géologie, ii. 269.

[b] The author cannot here mean, that the individual columns are horizontal; they are, on the contrary, perpendicular, or nearly so. The columns rising nearly to an equal height, form above a flat surface like a pavement. Hence the name, Giants' Causeway.—P.

[c] Dolomieu, Mémoires sur les isles Ponces, p. 100, *sqq.* Desmarets, Memoires de l'Acad. des Sciences, 1771, p. 273. Faujas Saint-Fond. Histoire Naturelle des Laves Prismatiques, &c.

[d] Dolomieu, Journal de Physique, Fructidor, an. ii. p. 408. Ibid. Pluvoise, même année, p. 118.

[e] See p. 96, art. Decomposed Lava.—P.

[f] Strom. Description du Canton d'Eger, p. 47, *sqq.* (in Dan.)

[g] Dauhuisson, Traduction de la théorie des Filons, p. 94, note 2.

[h] Mem. de la Société d'Histoire Naturelle de Copenhague. See in the course of this work the description of the Feroe Islands.

[i] Whenever beds of coal come in contact with trapp or basalt, the coal is generally found converted into a cindery substance, like coke, as if it had been subjected to heat under great pressure. This often occurs where dykes of trapp intersect the coal fields.—P.

not equally throughout the whole, had formed ruptures, and that it was thus subdivided, *with a kind of regularity*, into prisms of different kinds."[a]

A celebrated mineralogist, Werner, from considering the singular nature of basaltic rocks, and particularly the position of those of Saxony and Bohemia, thought that he had discovered, that the formation of these substances constitutes a distinct epoch, and requires causes quite different from those which have produced the ordinary kinds of earths and rocks. This philosopher imagined that a mechanico-chemical solution of a particular nature had once covered the globe. This solution produced precipitates analogous to its own nature; at first, gravel, clay, and sediment, purely mechanical; very soon after these, came the argilo-siliceous schists, named *wackes*, which already indicate the commencement of confused crystallization; then appeared the basalts. The mass of these being deposited upon almost the whole of the surface of the globe, the solution arrived at a state purely chemical, and afforded nothing but crystallized precipitates, such as the schistous porphyries, and the rocks called greenstone.[b]

According to this hypothesis of Werner, there is a possibility of explaining why isolated basaltic cones are found projecting from the midst of a soil of a different nature, for we may conceive that the parts the least crystallized of the basaltic solution, that is to say, the parts mixed with clay and gravel, after having been deposited and dried, were again decomposed and carried along, with other earths, by currents of water, far from the sides of the mountains which once were covered with them. In some places, this mass of decomposed basalt is extended more equably over considerable tracts of ground. The masses of basalt, which are not decomposed, have at the same time preserved the rocks which they covered from this slow disintegration, to the action of which almost all the ancient rocks are subjected. Thus it is by the continued removal and disappearance of the lower basaltic strata, that the detached cones have acquired their particular form, and that singular position and appearance which astonish the eye of the beholder.

This hypothesis of Werner, which more multiplied observations will either confirm or overthrow, fully explains only the position of basalt, and not its origin; we can, even while we admit the hypothesis of Werner, ascribe the origin of the solution of the constituent parts of basalt to whatever cause we choose; it is even very likely that caloric has been the principal agent in bringing to a state of fermentation and fusion those substances, probably crystallized, which furnished the materials of that solution; but the fermentation and the fusion, which have been followed up by a new coagulation of particles, and by their contraction into prismatic forms, have no connexion whatever with the system of phenomena arising from the agency of volcanos actually burning, or of other similar ancient volcanos, however powerful they may be supposed. The polar magnetism, which Haüy has observed in basalts,[c] seems to indicate, that they were originally trapps, in which a slow and uniform dilatation of particles has developed the magnetic fluid. It is desirable that we should observe the direction of the basaltic colonnades, and the position of each prism in relation to the equator and the magnetic poles.

Circumscribed as we are by the limits of our work, we must relinquish this interesting discussion concerning coagulated rocks, and proceed to the consideration of masses formed by *accumulation*. This is a portion of the globe which we may be said to have under our own eyes

Sand, *gravel*, some transported clays, that is to say, those which, by gliding and rolling, have changed their situation, and among which Werner places potter's earth; *tufa*, or stony substances formed by incrustation, such as the stalactites of caverns; the "*sinter*," or stony deposites of running waters; *breccias* of tertiary formation, that is to say, fragments of older rocks united by a cement of tufa; bog iron ore, although formed by chemical precipitation; some bituminous and aluminous earths, vegetable earth, and the *mud* of marshes; *turf*, or peat, composed of vegetable remains more recently buried, less decomposed, and less impregnated with bitumen than coal; *bituminous fossil wood*, a substance which appears to be incipient coal, and which even in some places nearly resembles true coal; these are the materials which generally constitute *earths of accumulation*. We shall develop the origin of each of these substances, in tracing hereafter the history of the changes which have taken place on the surface of the globe.

Substances projected by volcanos form the seventh class of solid masses which we have to consider.

Among the *volcanic productions*, there are some which have undergone an igneous fluidity; these are called *Lavas*, in the proper sense of the word. We have just seen that it is among these substances that several French mineralogists place the basalt, which other naturalists consider as having been formed by the agency of water. We have considered these rocks as the produce of a formation anterior even to the seas, and before the existence of volcanos; and we should consider it a most arbitrary arrangement to rank among the substances thrown out by volcanos, one which forms no part of any stream of lava that has ever been observed.[d] It is certain, however, that many true lavas have for their base petrosilex, feldspar, garnet, or rather amphigene,[e] [f] and other stony substances, which have preserved their appearance of stone, and which even enclose unaltered crystals; but these lavas never assume the regular form of basalt.[g] Other lavas have been vitrified, as the *obsidian*, or *agate of Iceland*, which has completely the appearance of glass. The volcanic glass has often an enamelled or pearly appearance, and is found in a capillary form.

The *pumice stone*, or *pumiced lava*, is the best known of volcanic productions. Dolomieu considers it as the produce of foliated granite and micaceous rocks, or even of granites, properly so called. "The component parts

[a] Bergmann, De Productis Vulcaniis.

[b] Werner, Classification des Roches, &c. &c. Daubuisson, Journal des Mines.

[c] Traité de Minéralogie, iv. 485.

[d] Those who advocate the volcanic origin of basalt, suppose it to have been ejected under the pressure of the ocean. Perhaps it has some connexion with the phenomena of mud volcanos.—P.

[e] Haüy Minéralogie, iv. 493. Dolomieu, Journal de Physique, Pluvoise, an. ii. p. 105.

[f] Leucite.

[g] Comp. Faujas Saint-Fond, Géologie, ii. part 2.

of these rocks have the property of mutually serving as fluxes, and have been able to undergo, by the action of fire, a demi-vitrification, which may be compared to calcined matter, or frit, a little swelled."[a] This opinion appears to be true as to certain kinds of pumice stone, but there are others which are produced from magnesian rocks, and especially from decomposed asbestos or amianthus.[b]

The different *scoriæ* are substances strongly vitrified, which swim sometimes upon the torrents of lava, and sometimes are thrown out like hail around the volcano.

The *volcanic sands* appear to consist of lava scorified to the last degree, or of scoriæ decomposed after being ejected.

The *puzzolanas* have not, like lava, experienced an igneous fluidity; they are substances of a more argillaceous nature than those which have formed the lavas: less acted on by sulphur, they have been able to resist the action of fire, which, instead of scorifying them, has only served to calcine and bake them. Heavier than the scoriæ, they fall near the centre of the volcanic mountain. United to lime, they form a cement of the greatest hardness and durability, which the Romans used in preference to every other in the construction of their aqueducts.

Volcanic ashes are discharged from the craters, in the midst of a column of smoke, and are then driven by the winds to great distances. Those of Etna are carried to Malta, and some say even to Africa. When these ashes are still suspended in the atmosphere, and when the vapours, which, at the same time, are dissolved in it, happen to condense, the mixture which thus takes place occasions those earthy showers which fall sometimes at a great distance from the volcanos themselves. These ashes, from the extreme minuteness of their particles, introduce themselves every where, enter into the closets for keeping provisions, where they vitiate every article of food; but this inconvenience is compensated by the advantage which accrues from their fertilizing the grounds, ravaged by burning torrents of lava.[c] The heat of the volcanos produces by sublimation, different substances, such as sulphur, muriate of ammonia, sulphuret of arsenic, and iron.

Volcanic *tufa* is a substance produced by the agglutination of volcanic ashes, or fragments of scoriæ. The muddy eruptions which take place in certain volcanos may be considered as the principal cause of the formation of volcanic tufa; masses of clay or of liquid mud, in rolling over the cinders thrown out by the volcanos, incorporate with them.[d] At other times, the volcanic substances, in flowing into the sea, may be agglutinated there by a stony cement, held in solution by the salt water.[e] [f]

We shall not enter into a detailed explanation of the substances contained in lava, the origin of which still perplexes the naturalist; but we ought to notice, in a few words, *altered* or *decomposed lava*.

It is an important, but obscure and difficult question, whether lava, by the action of air and water, is reduced into earth, or becomes, at least, partially softened. Italy furnishes examples favourable to this opinion; Iceland offers proofs to the contrary. The probability is, that no vitrified lava is decomposed; but that which has been calcined is altered by the action of sulphurous acid vapours. The mine of alum of La Tolfa, in the ancient Roman State, supplies us with an example of this; it is a lava, which, being decomposed by the sulphuric acid, is become white and friable.[g] Bergmann exposed some calcareous blackish and compact lavas, which came from Vesuvius, to the vapour of sulphuric acid; they acquired in a few hours the appearance and texture of chalk, similar in that respect to the neighbouring rocks of Solfatara.[h] There are naturalists who consider all lavas, even those most strongly vitrified, as penetrable by the acid gases; the sulphuric acid dissolves at first the iron, afterwards the aluminous earth and the lime; so that quartzeous earth, unchanged by acids, but attenuated and laid open, is at length carried away by the waters;[i] but these are possibilities, rather than ascertained facts. We conceive, at least in general, that the oxygen of the air has very little influence on lavas, and that the action of sulphuric, carbonic, and other gases, must be circumscribed to a small number of places.

It is proper, after volcanic substances, to mention those which owe their origin to the action of subterraneous fires in beds of coal. The best known is that which is commonly called *porcelain jasper*.[k]

The atmosphere has at all times contributed to augment the number of the solid substances of the globe. The *showers of stones* described as prodigies by many Greek and Roman historians, have been finally placed beyond the reach of doubt by the enlightened observations of Biot, Chladni, and other philosophers. All these substances thrown down upon the earth from the clouds, contain the same elements of silex, iron, and nickel. They seem to be only the nuclei, or kernels of those balls of fire which we often see traversing the atmosphere with a dazzling brightness, and disappearing in the twinkling of an eye. Thus the *bolides*, or atmospheric stones, should be concretions formed by the elementary gases, and perhaps by an effect of electricity; but they may also be regarded as so many satellites, or diminutive moons, which, revolving round our planet, terminate their course by uniting themselves to it, when causes that are unknown, but easy to be conceived, have deprived them of a part of their centrifugal force. Has Dr. Franklin been wrong in thinking, "that there may have been a time when it rained stones as it now does water?"

It now remains for us only to take a rapid survey of the substances which are foreign to the mineral kingdom, and which are found inserted among those that form the solid crust of the globe. These substances deserve a particular section to be appropriated to them.

[a] Dolomieu, Voyage aux îles Lipari, p. 6.
[b] Bergmann, De Productis Vulcaniis. Spallanzani, Œuvres, ii. 225, trad. de Senebier.
[c] Dolomieu, Mémoire sur les îles Ponces, p. 336, *sqq*.
[d] Dolomieu, Voyage aux îles Lipari, 56.
[e] Delamétherie, Théorie de la Terre, ii. 482. deuxième édition.
[f] This tendency to consolidation exists in many places along the sea coast. The sands and shells are there rapidly cemented into solid rock. This is strikingly the case at Messina, near Cadiz, and in Guadaloupe. Iron and lime are probably concerned in this cementation. It resembles the hardening of water lime.—P.
[g] Dolomieu, cited by Haüy, Minéralogie, iv. 505.
[h] Bergmann, Géog. Physique, ii. 197, (in Swedish.)
[i] Faujas Saint-Fond, Minéralogie des Volcans, chap. xix. p. 374.
[k] Thermantide porcellanite, Haüy, iv. 510.

BOOK XII.

Continuation of the Theory of Geography. Of the Fossil remains of Organic Bodies, Vegetable and Animal.

THE remains of organic beings buried in the earth may be viewed as so many geological medals, but medals without a date. The difference of age and of origin between the secondary and the tertiary rocks would be easily ascertained, if we could precisely and completely class the remains of organic bodies, each according to the earth or rock in which it is found; but this arduous undertaking, scarcely ever conceived by systematic geologists, has only of late become the object of researches that deserve to be called scientific.[a]

Organic fossils may be distributed into three classes; *remains* which have preserved their natural state, at least in part; *petrified substances*, and *impressions*.

The first class consists principally of bones, and even whole skeletons, which, after having been deprived of the skin and flesh that covered them, remain buried in the earth, or concealed in deep caverns. Sometimes they are calcined totally or in part, without having lost their configuration; sometimes they retain not only their texture, but even a certain portion of skin and flesh; we occasionally find them incrusted with a calcareous covering.

Petrifactions, taking this term in the ordinary sense, comprehend all the stony substances which have the figure of an organic body. There have been instances where a liquid impregnated with stony particles has flowed into a cavity formed by an organic body which had disappeared. In that case, the stony mass has flowed into the empty cavity, and assumed the exterior form of the organic body which was there before. If this body was, for example, a branch or trunk of a tree, the stone will have knots and wrinkles on its exterior; but in the interior it will exhibit all the characters of real stone. It will only be, according to Haüy, "the statue of the substance which it has replaced."

While the process of decomposition is going on gradually and obviously in a vegetable or animal substance, it is sometimes likewise surrounded and pressed on by a stony juice. As each organic particle dissolves and disappears, a stony particle replaces it. Thus, particle after particle, the stony substance gradually occupies the spaces left vacant by the progressive decay of the vegetable or animal parts; and, by being moulded in these cavities, it copies, feature for feature, the contexture of the organic body. This is the way in which it is usual to explain the formation of *petrified wood*, an imitation of the real wood so complete, that upon cutting it transversely, we distinguish the appearance of concentric rings, which in the living tree arise from its annual growth. Sometimes it is even in a state from which we can ascertain by the lineaments of the texture the species to which the tree belonged.[b]

Metallized bodies, and those which have been changed into bitumen or into coal, may be referred to the same system of formation. Thus, the *turquoises* for example, are the molar teeth of some large sea animal; a metallic substance which has penetrated them, has been gradually substituted for the softer parts of the bone.

Delamétherie justly observes,[c] that the siliceous matter so abundant in many organic bodies, has crystallized in the bosom of the earth, and produced a great part of the stony substance which constitutes petrifactions—for these being often of a siliceous nature, although found in the midst of clay, whence then could have come this siliceous liquid, if not from the petrified body itself?

Impressions are found between the laminæ of certain argillaceous schists; they are the relievos or moulds representing skeletons of animals, particularly fishes, leaves, reeds, entire plants, principally of the fern kind. These last impressions have this peculiarity, that if one of the laminæ presents a concave print of the face of the leaf opposite to that which bears the fructifications, (as generally happens,) the other lamina will present, not the hollow impression of the face of fructification, but the relievo of the same face, which is concave upon the other lamina. To all appearance, as Brúgnieres explains it,[d] the fern placed upon soft clay has been covered over again with a new deposite. Afterwards, this plant reduced into a carbonaceous substance, or penetrated by the minute particles of the schistous deposite, becomes incorporated and identified with it; and, as the surface of the fructifications is unequal, that opposite being more smooth, it is natural to imagine that there has been less cohesion between the clay and this smoother face. Hence the reason why this latter face generally presents itself, when the laminæ of the clayey schists are separated.

We shall now consider successively the different classes of fossil remains. The petrifactions of vegetables seem to belong to the quartzeous, aluminous, and magnesian schists, rather than to the calcareous rocks. The petrifying substance is most frequently of quartz-agate, onyx, or jasper;[e] it is not uncommon to meet with petrifactions which have been formed by pyrites.[f] A piece has been found, petrified by pyrites on the one side, and by agates on the other.[g] Petrified vegetables in lime, in gypsum, and even in clay, appear to be less frequent. Fossil ears of corn, impregnated with silver, with copper, and

[a] G. Cuvier, Extrait d'un ouvrage sur les espèces des quadrupèdes dont on a trouvé les ossemens dans l'intérieur de la terre. Paris, an ix. Et ses Mémoires dans les Annales du Muséum d'Histoire Naturelle. Lamarck, Mémoires sur les coquillages fossiles des environs de Paris. Annal. du Muséum. Blumenbach, Specimen Archæologiæ Telluris; See Gazette des Sciences de Gottingue, No. 199.

[b] Mongez le Jeune, Journal de Physique, 1731, p. 255, et suiv. (Comp. Daubenton, dans les Leçons de l'Ecole Normale, tome iii. p. 393, et suiv.)

[c] Théorie de la Terre, tome ii. p. 543.

[d] Journal d'Histoire Naturelle, No. 4. p. 125. et suiv.

[e] D'Argenville, Oryctologie, p. 355, tab. xx. Stoppen, Récréations Physiques, i. 702. Schulzen, sur les Bois pétrifiés. Dresde, 1754.

[f] Henckel, Pyritol. 224, 227, (in Latin.) Denso, Biblioth. Physique, i. 158.

[g] Bergmann, Géographie Physique, i. 307.

with other metallic substances, have been found in Switzerland, and near Frankenberg, in Hesse.[a] Sometimes only the exterior forms of the vegetable are perceptible; at other times, the different rings of the wood and tissue of the bark are to be distinguished. The "osteocollas," or calcareous tubes, appear to be incrustations formed around a vegetable root, which, deprived of its nourishing juices, has at last completely disappeared. Petrified fruits are sometimes spoken of, but they are very rare. They have been found on heights, where now they do not grow. A trunk of a petrified tree has been met with upon Mount Stella, in the country of the Grisons, at 4000 feet above the level where the last shrubs grow.[b] Entire beds of petrified wood exist at the elevation of 1500 feet above the sea, near the town of Munda, in Spain.[c]

The impressions of vegetables are almost exclusively found in the marly and argillaceous schists. Those of leaves and branches are common. Some have been met with, which present to us the most delicate traces of the structure of flowers, among others, the *aster alpinus*, near Ihlefeld, in the county of Hohenstein.[d] Like petrifactions they sometimes represent indigenous plants, or such as are natives of neighbouring countries; but those that are found in Europe oftener belong to the tropical climates of India and America.

Bernard de Jussieu had remarked, about a century ago, that the greater part of the fossil plants which are found in the bituminous schists of St. Chaumond, near Lyons, were foreign to our climates. There was recognised there, in particular, the fruit of a *nyctanthes*, the *polypodium*, and the *adiantium*.[e] In a marly fossil schist, covered over by lava, Faujas Saint-Fond met with impressions of the gossypium arboreum, the liquidambar styrax, the cassia fistula, and other vegetables of tropical climates. This same observer discovered the fruits of the areca palm in a deposite of decomposed fossil wood, named "*terre d'ombre*,"[f] near Cologne.[g]

The German, Scheuchzer, who has given an *antediluvian herbarium;* Woodward and Llwyd, and many other philosophers, have proved the same circumstance as to the fossil plants of their country. Delamétherie has shown, that the elastic fossil gum of Derbyshire was the cahoutchouc, which grows only in Peru. And the amber of Prussia is supposed to have been produced from forests of gum trees.[h]

Bituminated wood, although buried at great depths, may be the production of some less ancient and less violent revolutions. Pieces of wood have been found, of which one end was in a natural state, and the other bituminated.[i] And it is remarkable that this wood is often of an indigenous kind. At Upsal is preserved a large piece of an alder tree, which was discovered in Scania converted into jet, having still the bark and buds very discernible.[k] Thus bituminated wood approaches by degrees to the nature of *subterraneous forests*, or heaps of wood, which have been simply buried by some modern convulsion.

Among the remains of the animal kingdom, *shells* and *zoophytes* are the most abundant; they occupy immense spaces, but are principally found in the calcareous rocks. France furnishes us with the best known examples. The environs of Paris alone have supplied M. Lamarck with more than 60 genera, and this philosophical classification has not nearly reached its limits.[l] We know that a vast bed of chalk, accompanied by banks of shell limestone, extends from Rethel, through the departments of the Marne and the Aube, towards Sens.[m] The quantity of extraneous bodies which have been found in this belt of chalk, or in its vicinity, is very considerable. "In the environs of the town of Rheims, are found quarries filled with transparent belemnites, with sea urchins, or echini, and with pyrites of different forms. There likewise are to be seen in mingled confusion, cornua ammonis, fossil talc, petrified wood, and pieces of potter's earth full of impressions of leaves." From Chalons to Rheims, the soil is mixed with chalk, and contains belemnites, pectinites, echini, the teeth of fishes, and the broken points of echini. The canton of Courtagnon presents a bank of shells of several myriametres in length, and nearly two in breadth. It contains a quantity of fossils preserved entire, and some have even retained their colour and their polish. "More than sixty kinds are to be seen, such as purple oysters, pectinites, chamas, tellinas, mytilus, cardium, solen, cypræa, cornua ammonis, nerita, turbo, lepas, conus, arca, teeth of squalus maximus,[n] and also fossil corals."[o]

Below the town of Montmirail, between the farm of Tigecourt, and a hamlet called Le Faussat, at the confluence of the rivulet of Saint-Martin with the river called the Petit Morni, there is a very extensive bed of sand filled with fossil shells of every kind. This bed is five metres in height, and is covered with sixty-five centimetres of vegetable earth; below the bed of shells is another of yellow and gray sand, the layers of which are almost horizontal and parallel to the declivity of the soil. The quarries of Epernay, and of Dizy, along the Marne, furnish nearly the same fossils, as well as petrified wood, which resembles the true chestnut tree. In the cabinet of natural history at Chalons, a shark's tooth is preserved incrusted in chalk, and a petrified echinus, found at the depth of twenty-seven metres. All the plains of what was formerly called the Isle of France, present vast beds of calcareous and sandy stones, filled with, or rather composed of shells, some belonging to the kinds which inhabit our seas, others similar to those which exist in fresh waters, a circumstance which proves a difference both in their age and their origin.[p] [q]

[a] Scheuchzer, Oryctograph. Helvet. 209. Lehmann, Mémoires Physico-chimiques, (en All.)

[b] Mémoires de l'Academie des Sciences de Paris, an 1710.

[c] Hollmann, Philosoph. Transact. 1760, p. 506, *sqq.*

[d] Bergmann, Géog. Phys. i. 303.

[e] Mémoires de l'Academie des Sciences, 1718.

[f] *Earth of Cologne*, improperly called *Umber;* a variety of lignite, in a pulverulent form. The true umber is a variety of indurated clay, coloured by iron and manganese.—P.

[g] Delamétherie, Théorie de la Terre, § 1452.

[h] Copal?—P.

Lehmann, cited by Bergmann, Géog. Phys. i. 306.

[k] Bergmann, ibid.

[l] Bruslé, Statistique du Département de l'Aube, p. 6.

[m] Description du Département de la Marne, par la Société d'Agriculture et des Sciences du Département, p. 46, et suiv.

[n] "*Glossopetræ.*"

[o] Coquebert-Monbret, Journal des Mines, No. 94, p. 316.

[p] Cuvier et Brongniart, Géographie-Physique des Environs de Paris. Annales du Muséum, xi. 293.

[q] In the Paris basin, there are two alternations of marine and fresh water formations, in the following order, viz. lower marine—lower fresh water—upper marine—upper fresh water. They are distinguished principally by their shells.—P.

France still farther supplies an example of one enormous bed of shells, covered with no other substance. I allude to the *faluns*[a] of Touraine, one continuous bed of broken shells, of about nine ancient square leagues in superficial extent, and at least 20 feet in thickness. The whole mass of shells is estimated at 170 millions of cubic toises.[b]

The other countries of Europe are not less abundant in fossil shells. Twenty pages would be insufficient to enumerate the places of Germany where they are found; but there is one general remark of the German philosophers which is highly deserving of attention. The calcareous rocks of transition, and the schists of the same formation, in the chain of Hartz, contain only zoophytes, such as madrepores, millepores, and terebratulites; the stratified rocks, considered as the most ancient, contain not only zoophytes, but also belemnites, ammonites, encrinites, pentacrinites, in a word, shells the most remote from the actually existing kinds.[c] On the contrary, the most modern calcareous rocks, those of Mount Bolca, near Verona, and the hills of chalk in England, and Zealand, enclose kinds approaching to those which now exist, such as the ostracites, pectinites, buccinites, nautilites, chamites, and others.[d]

The north and south of Europe do not yield to the central parts in this respect. The calcareous rocks of Rœtwick, in Sweden, at 3000 feet above the sea; the vegetable earth of Finland, and the argillaceous beds of the islands of Norway, abound in shells, some whole, others almost changed into earth.[e]

In Italy, we see near Bologna a bed of sand formed of *cornua ammonis*, which are not one line in thickness.[f] In Greece and in Spain we often travel over nothing but shells. Ramond has found them in the Pyrenees, upon the summit of Mount Perdu, at the height of 10,578 feet; Lamanon, in the Dauphinese Alps, at 7446 feet; Guerin, upon Mount Ventoux, at 6162 feet; and Saussure, in the Alps of Savoy, at 6104 feet; it may be affirmed, almost with certainty, that throughout Europe, wherever there is limestone there also are shells.[g]

Every thing concurs in leading us to consider the other parts of the world as perfectly similar to Europe with respect to the abundance of shells. Vast heaps of echini exist in Lybia. Those of Barbary have been described by Shaw; and we know from Rœmer, that they are found in the gold mines of Akim in Guinea.[h] Mount Libanus is in a manner sown with echini,[i] and Mount Carmel with petrified oysters.[k] In the chains which border the Caspian Sea, shells are found even at a height above the region of the clouds.[l] We see beds of them interposed among the rocks of Mount Taurus in Caramania.[m] The mountains of China, according to the Jesuits,[n] are covered with them; and Siberia has offered to the Russian travellers not only calcined, but pyritized shells, and also madrepores.[o]

The philosophical traveller Peron has seen the coasts of Timor, New Holland, and a great many other oceanic lands, composed in a great measure of accumulations of marine testaceous animals. With regard to America, we learn from Kalm, that the United States and Canada contain enormous beds of calcareous matter.[p] We see Admiral Narborough seeking in vain, in the Bay of St. Julian, for oysters analogous to the shells of which he found the neighbouring mountains composed; and, lastly, in the centre of that hemisphere, M. de Humboldt points out to us the high chain of the Andes covered over with ostracites (petrified oyster-shells) at an elevation of 13,200 feet.[q]

The remains of other sea animals are less abundant; next to the testaceous kinds, fishes are the most frequent. They are found in Switzerland, near Glarus, in the slaty schists; in Germany, in the bituminous marly schist of Pappenheim; in the coppery schist of Eisleben; and in the stinking schist of Œhningen; in Egypt and in Syria; in the calcareous rocks upon the coast of Coromandel, and in several mountains of China.[r] The place which has furnished the greatest number, is Mount Bolca, near Verona in Italy.

France has furnished some very curious specimens; there has been discovered at Grandmont, at four leagues from Beaune, in Burgundy, a fish in a mass of hard gray limestone. Another, which was 10 inches 10 lines long, has also been found in a solid bed of stone, at 17 feet depth, at Nanterre, near Paris.

These are the only two examples of this kind; the other fossil fish hitherto discovered, not being incrusted in solid stone, but in the more recent strata. The fish of Nanterre appears to belong to the tribe of coryphænas, kinds similar to which live in the equatorial seas.[s] Other fossil fish have been found at Montmartre, and at the village of Devey-Louranc, in the department of the Ardèche.

The *glossopetræ* are sharks' teeth, (*squalus maximus*,) and are found almost every where, even adhering to the maxillary bone.[t] The calcareous rocks which border all the coasts of the Mediterranean, afford them in great quantities; they are frequent in Livonia, in the hills of Mount Ural, and in the steep shores which form the margin of the rivers of Siberia.

The fish, though there are some also found in calcareous rock and in freestone, seem to have been enveloped chiefly by the formation of the marly schists; but is it

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[a] *Falun*—"a collection of broken shells, found in mass, at a certain depth, and employed as a manure, like marl." *Dict. del' Acad.* The beds of oyster-shells, in the upper country of Georgia and Alabama, are *faluns*.—P.

[b] Reaumur, Mémoires de l'Acad. des Sciences, 1720, p. 404.

[c] Freisleben, Observations sur le Hartz, ii. 81.

[d] Steffens, Beytræge zur Innern, etc. p. 87.

[e] Bergmann, Géograph. Physique, i. 287. Linné, Pontopp. dan. &c.

[f] Comment. Bononienses, p. 66.

[g] Faujas Saint-Fond, Essai de Géologie, ii. 61, 66.

[h] Rœmer, Voyage, &c. p. 20. (in German.)

[i] Paul Lucas, Voyage, ii. 380.

[k] Corn. le Bruyn, Voyages au Lévant, ch. 59.

[l] Kæmpfer, Amœnitat, Exot. 430.

[m] Figueroo, Ambassadeur Espagnol, cité par Leibnitz, Protogea, § 23.

[n] D'Incarville, Philosoph. Transact, vol. xlviii.

[o] Georgi, Description de la Russie, iii. 599, &c. &c.

[p] Limestone, containing shells, extends, with some interruptions, from the primitive rocks of New England and the eastern border of the Alleghanies, to the Rocky Mountains. The immense beds of oyster-shells (*faluns*,) in Georgia and Alabama, occur in a limestone rock, very easily decomposible, and probably tertiary.—P.

[q] Humboldt, Tableau des Régions Équinoxiales, p. 126, 127.

[r] Scheuchzer, Piscium Querelæ et Vindiciæ, Zurich, 1708. Knorr, Lapides Diluvii Testes. Nuremberg, 1749. Tab. 17, 18. Gessner, de Petrificatis, cap. 27, p. 60, édit. 1759.

[s] Faujas, Essai de Géologie, tome i. chap. iv. et les Annales du Muséum.

[t] Leibnitz, Protogea, § 26—31. Tab. vi. vii. et les Dissertations citées par Bertrand, Dictionnaire des Fossiles, au mot *Glossopetra*.

to the oil contained by the fish, that some of these schists owe their bitumen, and others their urinous odour? This opinion of Werner merits examination.

It appears that amphibious animals did not exist in great number, till after the age in which fishes were produced. Cray fish,[a] however, occur at Pappenheim, Glarus, Verona, and in other places, by the side of fishes. An entire tortoise was found in the sand-stone, near Berlingen.[b] In the environs of Brussels, of Aix, in Provence, and in the quarries of the great Charonne, near Paris, different kinds of fossil tortoises have been met with;[c] but the most remarkable amphibious remains are the different kinds of lizards, which are commonly called *fossil crocodiles*, though it has been demonstrated that they are very different from the crocodiles, and partly of species as yet unknown.[d] The coppery schists of Thuringia, furnish specimens in considerable numbers;[e] and they are found at Elston, in England, imbedded in clay; but the most celebrated are those which have been discovered in the vast quarries of Maestricht, beneath a great calcareous mass.

The marine fossil animals are in a great measure foreign to the coasts of those countries where they have been found buried. The Abbé Fortis has discovered that the petrified fishes of Mount Bolca, in the Veronese, have their corresponding living species in the seas of Otaheite.[f] According to Linnæus, the porpites of Gothland appear to be petrifactions of the medusas of India.[g] The madrepores, so abundant in the frozen solitudes of Siberia, exist only in the equatorial and tropical seas. The greater part of the petrified shells that are found in England, are now to be met with, occupied by living tenants, only in the Atlantic Ocean, towards the coasts of Florida.[h] Dicquemare found near Havre, a shell, which is now seen, in a living state, only at Amboina.[i] Scheuchzer has given the description of many of the fossil shells of Germany, which do not exist in a living state in our seas, or perhaps in any quarter of the globe. It appears, beyond doubt, that the animals analogous to several fossil shells, such as the orthoceratites, the ammonites, the gryphites, the judaic stones, several echinites, and others, do no longer exist, or exist only in the unfathomable depths of the sea. The beds of these kinds of fossil shells, are called *pelagian*, whilst, under the name of *littoral beds*, are designated those containing indigenous shells deposited by the present sea.[k] We cannot, however, with confidence assert, that there are any of them to which the living species bear a perfect resemblance.

But can this observation, which holds so generally true in Europe, and the north of Asia, be extended to Africa, South America, and New Holland? Do we find there the shells and fishes of our northern seas? To this question no satisfactory answer can as yet be given. The testaceous fossils that occur in Lybia, resemble the marine animals of the gulf of Arabia; but we are assured that at Fez, in Morocco, both European and American shells are frequently found mingled together.[l]

Many singular circumstances are connected with these monuments of the history of our globe. The petrified and perfectly preserved shell is often found close by the side of several others, calcined, worm-eaten, and destroyed. Here the beds of the shells lie horizontally, with the concave part uppermost, and without any foreign mixture;[m] there, as is the case near Uddevalla, in Sweden, these remains are found in the midst of fragments of granite, of sand, and of clay, jumbled together in the greatest confusion.[n] Some fishes have been forcibly and suddenly enveloped in the substance which contains their impression, or their cast in petrifaction.[o] We can still perceive the violent and convulsive contortions into which these animals had thrown themselves to escape the terrible catastrophe of which they are the monuments. Sometimes, the association of these remains with metallic ores, presents singular appearances; at Jarlsberg, in Norway, muscles have been found in a mine of loadstone,[p] and petrified shells, with adhering threads of gold and silver, have been met with in England and in Siberia. The most uncommon objects of this kind appear to be the muscles that occur in cinnabar, completely filled with that metal.[q]

Thus, before our stratified mountains, and the metals which they contain, were formed, before the fragments of these mountains, uniting together, produced rocks and earths of accumulation, the globe must have been covered in a great measure, and at different periods, sometimes with the waters of the ocean, sometimes with a body of fresh water, and, lastly, with several fluids of an unknown nature, impregnated with substances which have enveloped the madrepores, the shells of marine, and of fresh water animals, and the fishes, whose petrifactions or impressions we find heaped up one above another. In the immense succession of ages which these tranquil formations required, interrupted from time to time by violent revolutions, it appears either that the mammiferous animals, the birds, and the great cetaceous animals did not yet exist, or that they existed in a situation which secured them against the effects of those catastrophes which buried the countless generations of the lesser sea animals in the bowels of the earth.

There have not, at least, been found any remains of the mammiferous, nor of the cetaceous race, decidedly covered over with a regular stony bed. The instance of the bones of an elephant, found under a calcareous bed in England, requires to be more completely verified.[r] The fossil teeth of the *trichechus rosmarus*, found in

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[a] Cray-fish are crustaceous animals, entirely different from the amphibia. The crustacea and the trilobites, their congeners, form a very numerous class of fossil remains.—P.

[b] Bergmann, Géog. Phys. i. 276.

[c] Faujas, Géologie, i. 187.

[d] Cuvier, Annales du Muséum, xii. 73, 145, &c.

[e] Miscell. Berolinens. 1710, p. 103.

[f] Journal de Physique, 1786. Mars, page 162.

[g] Linnæus, Amœnitates Academicæ, i. p. 91.; iv. tab. 3.

[h] Kalm, Dissertatio de Ortu Petrificat. p. 7.

[i] Journal de Physique, 1776. Janvier, p. 39.

[k] Another distinction is also made between fresh and salt water shells; and according as the one or the other prevail, in certain tertiary beds, they are called fresh or salt water formations. They alternate with each other in most of the tertiary basins.—P.

[l] Bourguet, Traité des Pétrifications.

[m] Kalm, Travels, &c. i. 292, (in Swedish.)

[n] Wallerius, Dissertat. de Collibus Uddewvallensibus.

[o] See Piscium Querelæ et Vindiciæ, by Scheuchzer, &c.

[p] Cronstedt, Minéralogie, p. 224. (en Suéd.)

[q] Bergmann, Géog. Phys. i. 301.

[r] Pennant's Works, xv. 158. Comp. Cuvier, Mémoires sur les Elephans Fossiles et Vivans. Annal. du Muséum, viii. 41.

Eastern Siberia, and the skeletons of whales discovered at Quebec,[a] and at Tistedal in Norway,[b] were lying in beds of moveable earth. Petrifactions and impressions of *insects* and *birds*, are rare, and seldom very distinctly marked. The accounts of honey-combs, petrified with bees, larvas, and eggs, found in a cavern of Upper Egypt, require additional confirmation.[c] The oldest remains of birds are met with in the marly schists of Pappenheim and Œhningen.[d e] The others are in general only incrustations of calcareous tufa, and consequently of the last age of geological revolutions.[f g]

We proceed now to examine the remains of quadrupeds; these are found accumulated in regions where similar animals do not now exist. Some are buried deep in beds of gypsum, as the kinds now unknown, and which Cuvier may be said to have resuscitated, namely, the *palæotherium* and the *anoplotherium*, with their different varieties, found in beds of gypsum in the environs of Paris;[h] others are met with in beds of sand or marshy ground, as the greater part of the bones of elephants; the *megalonyx*, an unknown animal of the tribe of sloths, of the size of an ox, and found in Virginia;[i] and the *megatherium*, discovered near Buenos Ayres, and which joins to a character approaching that of the sloth, the bulk of a rhinoceros.[k] There are some, indeed, which present themselves to view, accumulated in vast caverns, and destitute of any envelope; it is thus that the *fossil unicorn* has been found in the caverns of Harzdorf and of Baumann, in the mountain of Hartz, and the *fossil bear* in those of Gailenreuth and of Muggendorf, in the country of Bareuth.[l]

The fossil remains of this class are not less generally extended over the globe than those of marine animals. The *fossil elephant*, which is of a kind as different from that of India and Africa, as the horse is from the ass,[m] has left proofs of its ancient existence in all Europe, in Northern Asia, and in the New World. We know that Siberia annually exports a considerable quantity of fossil ivory;[n] a substance which abounds very much in that country. It is almost always seen where the waters of the rivers undermine the light soils which form their borders. The islands of Lachof, situated to the north of Siberia, are, according to a modern traveller, only heaps of sand, ice, and bones of elephants and rhinoceroses, mixed with those of great cetaceous animals, and even, agreeably to the latest accounts, with the remains of gigantic birds.

There have even been found in Siberia, whole carcasses of the elephant, which is there named *momot* or *mammoth*, covered with their flesh and skin, preserved by the frost which prevails in those regions.[o] In Europe, it is Germany which has furnished the greatest number, "because," says M. Cuvier, "it is in this empire that there is no canton without some well informed person capable of making researches, and publishing whatever is interesting in his discoveries." The skeleton of the elephant found at Tonna, in Thuringia, was imbedded in a sandy marl, covered over with layers of calcareous tufa, which in that country fills the cavities of stratified limestone.[p] In France, a great many bones of the elephant have been met with, from the discovery of those in Dauphiny, which were taken at first for the remains of a giant, or of Tentobochus, king of the Teutons,[q] to the appearance of those bones which were lately discovered in the forest of Bondi, and which are buried deep in a black earth, covered over by sand mixed with clay and marl.[r] Italy has furnished a harvest almost as abundant as Germany. The other countries of Europe are not without them. England contains several. Ostrobothnia supplies us with one specimen. If we pass the Atlantic Ocean, the New World presents three tracts of country in which they are found. In Iceland, one tooth of an elephant has been discovered.[s] North America contains some scattered bones, and several have been brought from the upland plain of Quito by Humboldt.[t]

Next to the mammoth, or fossil elephant, we should mention the *mastodon*, an animal nearly similar to the elephant, and like him graminivorous, although its teeth are furnished with many elevations. This animal, which the Anglo-Americans confound with the true mammoth, and of which there are five distinct kinds, all unknown in a living state,[u] has left its imposing remains upon both continents, for it is to a species of mastodon that we must refer, among others, the grinders, which are changed into turquoises, found near Simorre, in the department of Gers, and which had been at first attributed to an elephant.[x] It is upon the banks of the Ohio and of Hudson's river, in the United States, that the hugest remains of the mastodon are found; they have also been met with in Lower Louisiana.[y] Humboldt has discovered the bones of another species in the high plains of Quito, at the foot of the volcano Inibabura, and in the place called the *Field of the Giants*, from 7000 to 8000 feet[z] above the level of the sea.

The fossil bones of the rhinoceros and hippopotamus, belong to species different from those which exist at the present day. They are often found in the immediate

[a] Kalm, Voyage d'Amérique, &c. iii. 247, (en Suéd.)
[b] Pontoppidan, Hist. Nat. de la Norwège, i. 63, (en Dan.)
[c] Lippi, Mém. de l'Académie de Paris, 1705.
[d] Scheuchzer, Vindic. Piscium, tab. 2.
[e] These remains are considered doubtful. The remains of fishes are very abundant in these two localities. The remains of lizards are also found there.—P.
[f] Bergmann, Géograph. Physiq. i. 275.
[g] Remains of birds have been found in the gypsum of Paris, (See note b p. 102;) also in the breccia of fissures, in the S. of France, of the orders Grallæ and Gallinaceæ. (*Marcel de Serres.*)—P.
[h] Cuvier, Mém. sur les os Fossiles de la Pierre à Plâtre des Environs de Paris. Annal. du Muséum, iii. 275, 364, 442.; iv. 66.; vi. 253.
[i] Id. ibid. v. 358.
[k] Id. ibid. v. 376. Description des os de Megatherium, par Bru, ibid. 388.
[l] Blumenbach, Specimen Archæologiæ Telluris, l. c. id. Manuel d'Histoire Naturelle, 695, (en All.)
[m] Cuvier, Sur les Eléphans Vivans et Fossiles, Annal. du Muséum, viii. 265.
[n] Momotova kosti, i. e. bones of the Mammoth, or Momot. *Momotova* is the genitive plural in Russian.
[o] Adams, Voyage à la Mer Glaciale, Annal. du Muséum.
[p] Freisleben, Description Mineral. du Canton de Burg-Tonna, dans le Magasin de la Science du Mineur, vol. x. p. 51.
[q] Faujas, Annal. du Muséum, ii. 24.
[r] Cuvier, Annal. du Muséum, viii. 21.
[s] Bertholin, Acta Medic. Hafn. i. 83.
[t] Humboldt, cited by Cuvier, Annal. du Mus. viii. 57.
[u] Cuvier, Annal. du Muséum, viii. 412.
[x] Cuvier, Annal. du Muséum, no. 14, p. 132. Faujas Saint-Fond, Journal de Physique, 1794. Decembre, p. 445.
[y] Peale's Historical Disquisition, &c. London, 1803. Volney, Tableau du Climat des Etats Unis, i. 100. Cuvier, sur le Grand Mastodonte, Annal. du Muséum, viii. 270, *sqq.*
[z] 1200 to 1300 toises.

vicinity of the remains of the elephants. The most remarkable remains of the rhinoceros is the head, which has been taken out almost unaltered from the turf pits, on the Wiloui, a river of Siberia.

Among the fossil animals called *tapirs*, there has been found a variety, whose dimensions are gigantic. Some kinds of animals now very small, and whose weakness leaves them an easy prey to the more powerful, appear from their fossil remains to have once rivalled the strongest animals. Of this number we have already mentioned two species, approaching to that of the sloth, one of which has been found in Virginia, the other in the environs of Buenos Ayres; the first is the *megalonyx*, of the size of an ox, the other the *megatherium*, which has the dimensions of an elephant.[a] [b]

We cannot enumerate, kind by kind, the various animals of which fossil fragments are to be found, and we shall abstain from inquiring whether the carnivorous animals, of which the caverns of Germany contain so many remains, are different from the bears, the lions, and the hyenas of the present age, and from any attempt to resolve the doubts which still remain respecting the fossil fragments of ruminating animals, among which the *elk of Ireland*, and the great buffalo of Siberia, hold the first rank.[c] The variegated marbles[d] of Gibraltar, Cette, and other places, exhibit also, under circumstances that are quite inexplicable, innumerable bones of ruminating animals, analogous to the living kinds in Europe.[e] At the same time we must not omit to mention the curious discovery of the skeleton of an animal of the *opossum* kind, found in the plaster quarries of the environs of Paris.[f] This very peculiar genus is now no where to be found but in South America.[g] [h]

These discoveries, though as yet scarcely commenced, have thrown already a new light upon the revolutions which our globe must have undergone, and upon the periods which must have preceded the present course and constitution of nature.

How many species of animals are there extinct, and by what various revolutions! The animals, the remains of which are now found in caverns, evidently appear to have retired thither of themselves to seek shelter from some sudden revolution, the irresistible violence of which, notwithstanding, involved them in general destruction.[i] Were they flying from a sudden inundation? Did they implore of these caverns protection from some baneful alteration of climate? Or did they use them as spacious cemeteries for the regular interment of their dead, according to the reported habits of the elephants of Africa? In every instance, the almost entire state in which many of their bones are found, and the nature of the calcareous tufa with which the others are surrounded, evidently show the recent date of this last revolution of the globe.[k]

The animals whose remains are found in such great quantities in gypsum, are generally of one single kind, or at least of one tribe. This circumstance occurs only in islands or insulated continents; it would hence appear, that these animals inhabited small portions of land which at one period were engulphed in the sea.[l]

The light soils which fill the bottoms of valleys, and which cover the surface of great plains, have furnished us, in the single orders of *pachydermata*, and *elephants*, with bones of eleven species, namely, a *rhinoceros*, two *hippopotami*, two *tapirs*, an *elephant*, and five *mastodons*.[m] All these eleven species are now absolutely strangers to

[a] See p. 101.

[b] Fossil remains of several extinct genera of quadrupeds, have been found in the tertiary strata of France, particularly in the gypsum of the Paris basin, viz. the Palæotherium, 10 species, varying in size from a rhinoceros to a hare; the Lophiodon, more than 12 species, from a rhinoceros to a young lamb; the Anoplotherium, 6 species, from the size of an ass to less than a hare; one of them, of the size of a wild boar, had the shape and habits of an otter; the Antracotherium, two species, one of the size of a rhinoceros; the Cheropotamus and Adapis, each one species, of the size of a rabbit. In the same formation were the bones of a fox, a genet, a bat, an opossum, a dormouse, and a squirrel; also of birds, of 5 existing genera, and others uncertain, mostly of waterfowl; of crocodiles, tortoises, and fishes. These are supposed to be remains of terrestrial and fresh water animals; and the whole is probably the deposite of an ancient lake.—P.

[c] Cuvier, sur les Os Fossiles des Ruminans, dans les Annal. du Muséum, xii. 333, *sqq.*

[d] "*Brèches calcaires*," calcareous breccias.—P.

[e] See note k, p. 102.—P.

[f] A fossil opossum has been found in the Stonesfield slate (Eng.) below the oolites.—P.

[g] Cuvier, Ann. du Mus. v. 277—292.

[h] See note, (d) p. 188.—P.

[i] Blumenbach, Specimen Archæologiæ, etc. etc. l. c.

[k] The bones found in caves and fissures, have been shown by the investigations of Cuvier, Buckland, Marcel de Serres, &c. to be of more recent date than the newest regularly stratified formations. They have all many general features of resemblance, both with each other, and with those found in beds of diluvial gravel. The bones found in caves are generally imbedded in mud and gravel, more or less covered over by stalagmite. In the cave of Kühloch, in Germany, the floor is covered by a thick stratum of animal earth, formed by the decomposition of the bones of bears. The bones in fissures are generally imbedded in a calcareous breccia, firmly consolidated, and entirely occupying the fissures, so as to seem a part of the general mass of rock. Fissures containg bones have been particularly observed in the limestone rocks of Gibraltar, and in those along the Mediterranean in France, from Perpignan to Nice, particularly around Montpelier, in Corsica, Dalmatia, Greece, &c. The bones found in these fissures, belong to the antelope, ox, horse, ass, hare, rabbit, Siberian hare (Lagomys,) mouse, water rat, the backbone of a snake, with land and fresh water shells, &c. M. de Serres has recently observed, in the fissures in the S. of France, bones of camels and sheep, birds (grallæ and gallinaceæ,) lizards, snakes, and tortoises; also bones of the rhinoceros and hippopotamus. He has also observed along with them, bones of marine quadrupeds, and marine shells; but these, he thinks, were detached fragments of older formations, carried in by the currents, which filled the fissures. These breccias were also found to contain numerous fragments of volcanic rocks, lavas, scoriæ, and obsidian, carried in by the same means. He thinks these fissures were filled by general currents proceeding from N. to S., as they lie almost invariably in that direction. Mr. Buckland, from his investigations in the bone caves of England and Germany, has arrived at the following general conclusions:—1. These bones are partly antediluvian, and partly post-diluvian. 2. Of the former, some are of animals, which retired to the caves to die, during many successive generations, as the bears in the caves of Germany. 3. Others were dragged in by beasts of prey which inhabited the caves, as in the cave of Kirkdale (Yorkshire,) occupied by hyenas. 4. Others fell into open fissures and caves, now either filled with breccia or partly empty, as in the rocks of Gibraltar, and the caves near Plymouth (Eng.) 5. Others were washed in, with mud and pebbles, at the deluge. 6. Of the latter are all those which have fallen into open fissures, or entered caves, since the deluge; a circumstance of constant occurrence. The bones found in these situations, are generally similar to those found in the superficial loam and gravel, called *Diluvium*. Some of them belong to extinct species. They belong to at least 15 distinct genera. Among them are the Elephant, Rhinoceros, and Hippopotamus, extensively distributed, the cave bear, and cave hyena, in but few localities; the former in Germany, the latter at Kirkdale; a tiger, 2 species of deer, a mastodon, a tapir, &c. Mr. Buckland contends that many of these bones were carried in by general diluvial currents, which corresponds with M. de Serres' opinion on the filling of fissures. The mouths of many of these caves are now high in the face of cliffs, and inaccessible to any existing stream of water. Dr. Fleming thinks they were carried in, along with the imbedding mud and gravel, by the waters of rivers, as they are generally found at the lowest points of the caves; and that where the caves are now inaccessible, the rock has been worn down to its present bed.—P.

[l] Cuvier, Annal. du Muséum, iii. 386.

[m] Id. Annales du Muséum, viii. 421, *sqq.*

the climates where their bones are found. The five mastodons alone can be considered as forming a genus separate and unknown, but very nearly allied to that of the elephant. All the others belong to genera now existing in the torrid zone; and three of these living genera are found only on the ancient continent, namely, the rhinoceros, the hippopotamus, and the elephant. The fourth, that of the tapir, exists only in the new. The same distribution does not hold as to the fossil animals. It is in the ancient continent that the bones of the tapirs have been dug up; and there have been some bones of elephants found in the new. These species, belonging to known *genera*, differ, notwithstanding, essentially from the known *species;* they must therefore be considered as particular species, and not merely as particular varieties. The subject cannot admit of any dispute as to the small hippopotamus, and the gigantic tapir; it is also very clear with respect to the fossil rhinoceros, and extremely probable as to the elephant and fossil tapir. The great hippopotamus is the only one of the eleven quadrupeds concerning which there remain any doubts.

These different bones are buried almost every where in beds nearly alike. They are often mixed in confusion with some other animals as nearly resembling those of the present time. These beds are generally light, either sandy or marly, and always more or less near to the surface. It is probable, therefore, that these bones have been enveloped by the last revolution of the globe. In many places they are accompanied by the accumulated exuviæ of marine animals. But there are some places which do not afford any of those exuviæ. Sometimes even the sand or the marl which covers them over, contains only fresh water shells. Although a small number of shells attached to these fossil bones indicate that they have remained some time under water, no very authentic account attests that they are found beneath regular stony beds, filled with marine shells, nor consequently that the sea had covered them for a great length of time.[a]

The catastrophe which has covered them over, would appear then to have been a great but transient inundation of the sea, if these bones had not been found upon the top of high mountains, where the present sea at least could not have reached in its most violent agitations. On the other hand, these bones presenting no trace of having been rolled up and down, occurring only fractured, as we find those of our domestic animals, and sometimes joined together in the form of skeletons, often even as it were heaped up in common cemeteries, clearly demonstrate that the catastrophe which has destroyed the living beings to which they belonged, must have overtaken them in the same climates where we meet with these records of their former existence. These two conclusions, drawn from evident facts, destroy the hypothesis according to which the extinction of these animals would be the immediate effect of a great revolution of the temperature of the globe; for such a revolution would have still permitted these animals to seek another habitation. Nothing besides in the structure of these animals positively announces that they could not have lived in a cold climate; only the quantity of nourishment which such huge animated masses required, and their numbers, proved by the existence of the carnivorous kinds, render it probable that the countries where we find their remains, once enjoyed a temperature, if not warmer, at least more favourable to vegetation.

The total absence of human bones in these different collections of remains, proves that man did not exist anterior to the last revolution of the globe.[b]

Thus have we hastily surveyed the immense series of the solid substances which form the crust of our globe, from the granite summit of the Alps to the bottom of the deepest mines; and every thing we have met with has suggested the existence of a fluid substance, without which the solid masses would not have experienced either those decompositions, or those re-unions of which we have perceived the most evident traces. Here then we shall close our *geological* observations, and proceed to *hydrology*, or the theory of the waters spread over the surface of the globe.

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[a] Cuvier, viii. 266, 422.

[b] Human bones have never been found in any regularly stratified formation; nor even in the beds of diluvial earth and gravel, or among the diluvial fragments in caves and fissures. They are all decidedly post-diluvian, as far as they have been hitherto discovered. The same is true of the quadrumana, including the apes and makis, animals which approach nearest to the human form. The human skeletons from Guadaloupe, were found imbedded in a firm calcareous tufa, still in a continual progress of formation, and therefore quite recent. Human bones are also found in some open caves, as in the cave of Pavi land (S. Wales,) and in the nitre caves of Kentucky and Tennessee. They have also been found in peat bogs, &c.; but these are all formations of the present period.—P.

BOOK XIII.

Continuation of the Theory of Geography. Of Water in general. Of Springs, Rivers, and Lakes.

WATER, in its pure state, is a transparent fluid, without colour or smell, and possessing great mobility. It presents itself under three forms of aggregation, as a solid, when it is *ice;* as a liquid, when it is called water; and, lastly, as a vapour or atmospheric gas. Water was long regarded as an element, but modern chemistry reckons among its triumphs the discovery of the elementary substances, of which even water is composed.

Water, in its state of purity, contains 85 hundredth parts of oxygen gas, or pure air, combined with 15 hundredth parts of hydrogen gas or inflammable air; but we very seldom find water perfectly pure, as it generally holds in solution siliceous, calcareous, and metallic particles, acids, and sulphur. The air is dissolved by water, which it dissolves in its turn, and in a still greater proportion. It is even probable that the whole earth, or at least the exterior crust of our globe, was once in a state of mechanical or chemical solution by the agency of an aqueous fluid. We wish to pursue a course independent of all system, beginning with those circumstances which are most easily observed, and advancing from the smaller to the greater objects.

Springs are so many little reservoirs, which receive their waters from the neighbouring ground, through small lateral canals, and which discharge their excess either by overflowing or in some other manner.

The origin of springs cannot be referred to one exclusive cause: nature, simple in her general laws, avails herself of a great variety of means; thus the precipitation of atmospheric vapours, the dissolving of ice, the filtering of sea waters, and the condensation of subterraneous vapours, all concur in the formation of springs.[a]

Mountains, as is obvious to the most superficial observer, attract the fogs and clouds which float around them. As the cold is increased in proportion to the increase of elevation, it necessarily follows that more snow must fall, and more ice will be formed on the mountains than on the plains. These are the two principal apparent causes which contribute to saturate mountains with the water which flows from them in all directions. But are these the only causes? Are we to believe that those extensive lakes which are met with at considerable elevations, and the glaciers which cover the Alps, have been gradually formed by the rain and snow, or must we admit that, at the origin of things, at the period when extensive crystallizations took place, the water united itself by a kind of elective attraction to certain substances, in preference to the rest of the earth?

The opinion of the ancients and of Descartes, who attributed the origin of springs to the filtration of the waters of the sea, is not entirely groundless. It is true, that all running waters have their sources far above the level of the sea. The direct filtration of sea water, can take place no where except in pools, which are separated from the ocean only by flat and sandy ground. But the phenomena of capillary tubes may obtain in the interior of the earth. The sea waters, deprived of their salt and bitter elements, may ascend through the imperceptible pores of several rocks, from which being disengaged by heat, they will form those subterraneous vapours to which many springs owe their origin. We may here quote the example of the Chartreux, who, seeing their springs dried up, and learning that thick vapours were observed to ascend from a neighbouring quarry newly opened, they bought the quarry, closed it up, and beheld their springs reappear.[b] A similar occurrence happened in Sclavonia.[c] The freshening of sea water is satisfactorily proved by the diminution of saltness in the springs, which evidently originate from such filtrations.[d] The fresh, as well as the salt springs in Bermuda, rise and fall with the ebb and flow of the tide.[e]

It was formerly thought that rain water did not penetrate to any great depth in the earth, but was entirely absorbed by the first strata of the soil, and that it fell in too small a quantity to afford supplies, either to torrents or to rivers. But, if we observe the disposition of those strata which compose the surface of the globe, we shall find them all more or less inclined, overturned and cracked, from the numerous convulsions which they have undergone, or from the manner in which they have been formed. The rain water flows rapidly through the interstices and cracks of the upper strata, and does not stop until it arrives at the clayey part of the soils, which is the general termination of its filtering, and forms its natural reservoirs. Observation has also proved, that rain water filters down to very great depths. In the coal mines of Auvergne,[f] it has been seen to penetrate as far as 250 feet. In Misnia, a town and district of Saxony, called also Meissen, rain water has been observed to distil in drops from the roof of a mine 1600 feet deep.[g h]

The snow and ice, it must be admitted, in some countries, produce a greater quantity of running water than the rain, the dews, and the aqueous vapours. But, in order to conceive how much the slow and gentle, but uninterrupted influence of these latter agents contribute to the formation of springs, we have only to consider Apulia and other peninsulas, almost destitute of running water, because their mountains do not constitute a mass sufficient, either from its elevation or its bulk, to attract and retain the aqueous vapours of the atmosphere. On the same principle, since it is from the sea that the atmosphere exhales its water in the gaseous form, it is easy to explain why the interior of great continents, such as Africa and Asia, contain such barren deserts.

[a] Bergmann, Géographie-Physique, i. 325—334.
[b] Perrault, Œuvres Diverses, p. 819.
[c] Bergmann, ibid. 331.
[d] Lulof, Géog.-Physique, § 358.
[e] Norwood, Philosoph. Transactions abridged, ii. 298.
[f] Le Monnier, Observations d'Hist. Naturelle, p. 194.
[g] Muschenbroek, Instit. Phys. § 894.
[h] By what test was this known to be rain water?—P.

If the two Americas are more abundantly watered, they owe it to the extent and elevation of their mountains, as well as to the continuity of their declivities.[a]

The water which circulates on the surface of the globe has generally no other principle of motion than its own specific gravity, and the declivity of the earth. It is this declivity which carries it from mountain to mountain, from valley to valley, until it falls into the basin of the ocean.

The *spouting springs*, which sometimes form natural jets of water, follow the same rules of equilibrium as the others, except that the canals which furnish them with water come from great elevations, and with a rapid descent. Waters thus carried into a subterraneous reservoir, finding themselves closely confined, burst forth in consequence of the pressure, just like those water spouting fountains and works with which art embellishes our gardens. *Jets of boiling water*, which appear to accompany volcanos, probably obey the same laws. A French naturalist, however, is of opinion, that the majestic phenomena of the spring called the Geyser, in Iceland, are produced by subterranean vapours, which, suddenly bursting forth, raise a mass of water collected in the ancient crater of a volcano.[b] But it is more probable that this spring receives its waters from the neighbouring heights.

The *intermitting fountains*, particularly such as rise and fall at regular periods, so excite the wonder of the people, that they give them the name of *miraculous fountains*. The periodical fountain of Como in Italy, has been described by Pliny; it rises and falls every hour.[c] There is another in the town of Colmars, in Provence, which rises eight times in an hour. There is one at Fronzanches, in Languedoc, the period of whose rising is each day fifty minutes later than the preceding day.[d] The *round fountain*,[e] on the road from Pontarlier to Touillon, in Franche-Comté, rises with a boiling appearance. The *Bullerborn*, in the bishopric of Paderborn, in Westphalia, rises with great noise. Near Brest, there is a well 75 feet from the sea, which sinks with the flow and rises with the ebbing of the sea.[f] England furnishes many examples of these springs, one particularly near Torbay, in Devonshire, and one at Buxton, in Derbyshire. According to Gruner, there is one at Engstler, in the canton of Berne, which has a double intermission daily and annually.[g] But of all these springs, of which many more examples might be adduced, none exhibits a perfectly regular course. These springs are accounted for by supposing, that in the lands where they are situated, there are reservoirs and conducting pipes in the form of syphons. It is perhaps unnecessary to explain, that the liquid begins to flow through the syphon as soon as the surface of the liquid, in which one end of the tube is placed, is on a level with the curvature of the two branches; and the flowing continues as long as the fluid keeps above the orifice of the branch or end inserted in it. The moment the orifice ceases to be immersed in the liquid, the flowing ceases, and it recommences as soon as the reservoir is filled to the level of the bending. With respect to the reservoirs which supply these fountains, drought, rain, and the melting of snows, may so affect them, as to render their periodical return more or less regular. The connexion subsisting between the greater or less humidity of the atmosphere, and the reservoirs of intermitting fountains, justifies to a certain degree the conjectures which are sometimes formed from the movements of these springs as to the nature of the approaching season, conjectures which have given to some of them the name of fountains of *dearth and plenty*.[h]

It is natural to imagine, that many channels of water not finding any other suitable outlet, flow into subterraneous cavities, are absorbed by the earth, or discharge themselves below ground into the sea. We may thus explain the origin of those springs of fresh water that are to be seen spouting up even in the midst of the waves of the ocean. The water thrown up by volcanos, the sudden and terrible inundations of mines, the number of rivers which disappear, the mountains suddenly engulphed in the bosom of new lakes, all these facts combine in proving, that there are considerable subterraneous cavities, often filled with water. The necessity of supplying the scarcity of springs by digging wells, has procured us the knowledge of a fact still more interesting to physical geography. It appears, that there are lakes, or rather sheets of water, which extend under ground to considerable distances. Delamétherie relates,[i] that in the province of Artois, near Aire, in digging wells, they always come to a clayey bed, which, being pierced, the water gushes out in large bubbles, and, rising up, forms springs which continually flow.[k] In the country of Modena, we find every where, at the depth of 63 feet, a bed of clay five feet thick, and beneath it water which spouts out with much force.[l] In the interior of the country of Algiers, in the province of Wad-Reag, the inhabitants, after digging 200 fathoms deep, invariably meet with a stratum of slate, under which the water flows in such abundance, that they name it the *subterraneous sea*.[m] We may easily conceive that one stratum of clay may have sunk down horizontally by drying, whilst another stratum of clay may have been forced upwards. The fissure horizontally formed in this

[a] In some instances the position of these great deserts, in the most central points of the great continents, would lead to the conclusion, that they owed their origin to their distance from the sea; and in others their immense extent would seem to indicate, that it is due to the absence of mountains, as points for the condensation of vapours. But on the other hand, some of them immediately border on the sea coast, and others are comparatively of small extent, and nearly surrounded by mountains. They are found too both in very cold, and in very hot climates. They seem to owe their character, in part, at least, to the sandy, saline and bibulous nature of their soil; in many cases, if not in all, belonging to the new red sand-stone formation.—P.

[b] Delamétherie, Théorie de la Terre, iv. 309, (2d edit.)

[c] Pliny, l. ii. c. 103. Scheuchzer, Hydrograph. Helvetica, p. 126.

[d] Astruc, Histoire Naturelle de Languedoc et de la Provence.

[e] "*La fontaine ronde.*"

[f] Journal de Trévoux, 1728, Octobre.

[g] Scheuchzer, Iter Alpin. 26, ii. 404.

[h] Kant, Géographie-Physique, ii. part. 2. p. 224.

[i] Théorie de la Terre, tome iv. p. 563.

[k] These are called *Artesian wells*, from their locality. They are thought to be occasioned by the gradual subsidence of strata; Artois lying near the skirts of a geological basin, sufficiently far, however, towards the centre, for the strata which rise on its borders, to sink as far below the surface, as the depth from which the water rises. These strata are supposed to furnish a passage for the water; and when perforated, it rises by pressure as in a fountain. Such wells have been opened in the U. States, particularly near New Brunswick, N. J. The flow of water is uniform.—P.

[l] Ramazzini, Topographia Mutinensis.

[m] Shaw, Voyage en Barbarie, tome i. p. 169.

manner, may have served as a channel for the lakes or rivers which constitute these extensive subterraneous waters.

The glaciers which crown the tops of the highest mountains, have a close connexion and a common origin with springs. Snows accumulated for whole centuries, sink down, and are compressed and consolidated as much by evaporation, as by alternate thaws and frosts. Thus are formed immense caps which cover whole mountains, or fields of frozen snow which extend between the summits: The high valleys are filled at the same time with the snow which falls there, and with the icy waters which flow from the snowy summits. In fact, these flowings alone, joined to the avalanches, occasion those masses of pure ice, the branches of which extend even to the lower valleys. The latter masses of ice seem in some places to have continued increasing for a long series of years. They have, in Switzerland, filled up even whole valleys, buried villages, and shut up the pass between the Valais and the Canton of Berne—but the diminutions on one side generally compensate for the increase of the other. A few warm seasons are sufficient to re-establish the equilibrium.[a]

The scenes which these bodies of ice exhibit are as various as their extent. At one time a great mass of water, congealed at the period of a tempest, presents waves resembling those of a lake—at other times these inequalities disappear, and leave nothing to be beheld by the astonished traveller, but one immense mirror of polished ice. Here superb portals of crystal appear fallen in ruins, and brilliant spires broken to pieces—in other places, avalanches of snow glide over a field of ice and then stop, and, fashioned by the rays of the sun, take the form of pyramids and obelisks unseen before. These glaciers are of essential service in furnishing to the continents slowly, and in an almost regular manner, waters which, without this congelation, would be precipitated with impetuosity from the height of the mountains, so as to overflow and devastate the countries which they ought to fertilize. For this beneficial effect, we are indebted to the intense cold which converts the waters into snow and ice, and holds them suspended on the sides of the mountains, to supply abundant and unfailing streams oozing from the bottom of these enormous masses, or from the bosom of their crystalline grottos.

The effusion of springs, and the flowings of melted ice, form little currents, more or less gentle, which are termed *rivulets*. The water of great rains falls with more rapidity, and furrows the sides of the mountains by impetuous irregular *torrents*. The union of these currents forms *streams*, which, following the declivity of the ground, unite most frequently in a great canal which takes the name of *river*, and which conveys to the ocean the collected tribute of the earth.

The declivities (considered collectively, and as a whole,) from whence flow the streams and rivulets which discharge themselves into one particular river, are called the basin of that river, or its hydrographical region. It frequently happens, that the basins of two rivers almost touch. In America, the Cassiquiari, and some other rivers, actually unite the basin of the Oronoco, with that of the Amazon.[b] In Europe, the sources of the Dwina, of the Niemen, and of the Borysthenes, nearly meet together in a marshy plain. Geology has been much employed in investigating the subject of *basins;* in general, the mineral beds and petrifactions of the same basin present a certain analogy; but, (according to the just observation of M. Desmarets,) it is also essential to distinguish with accuracy the hydrographical masses or groupes of mountains which furnish water to rivers that receive no supply from any other quarter. The knowledge of these masses is indispensable to assist us in explaining the nature of rivers. Calcareous soils produce waters of a very different nature from those which flow from glaciers over sand or clay. The elevation of the springs determines the amount of the declivity, and this latter circumstance modifies the course of streams and rivers, rendering them rapid or gentle, regular or meandering.

The beds of rivers are the lowest parts of great chasms, formed by the same revolution which produced the mountains: The atmospheric waters have evidently brought down a portion of light soil which was adhering to the sides of the mountains; they may have formed by their sediments, the horizontal plains which occupy the bottom of certain valleys;[c] but never could a river by its own force alone have opened for itself a passage through solid rocks, similar to those which border the upper Rhine; it must at the first have found the outline of its course deeply marked out. Running waters unceasingly wear away their beds and banks in places where the declivity is very rapid; they hollow out and deepen their channels in mountains composed of rocks of a moderate hardness—they draw along stones, and form accumulations of them in the lower part of their course—and thus their beds are often gradually elevated in the plains, while they are deepened and depressed in the mountains; but these changes, though continually going on for thousands of years, could only give form to the banks of rivers; they in no wise created the banks themselves.

It is only the sloping of the land which can at first cause water to flow; but an impulse having been once communicated to the mass, the pressure alone of the water will keep it in motion, even if there were no declivity at all. Many great rivers in fact flow with an almost imperceptible declivity. The river of the Amazons has only ten feet and a half of declivity upon two hundred leagues of extent of water, which makes $\frac{1}{217}$ of an inch for every 1000 feet.[d] The Seine,[e] between Valvins and Serves, has only one foot declivity out of 6600. The Loire has, between Pouilly and Briare, one foot in 7500; but between Briare and Orleans, only one foot in 13,596. In East Friezland, in the United Provinces, two small neighbouring rivers have, the one $\frac{1}{8}$, the other $\frac{1}{3}$ of an inch of declivity for every 1000 feet.[f] The Marwede, between

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[a] Saussure, Voyages, Gruner, etc.

[b] Condamine, Voyage de la Riviere des Amazons, p. 119. Hartsink, Humboldt, etc.

[c] Comp. Saussure, Voyages, §§ 648, 920. Delamétherie, § 1618. For the action of rivers, see Bourguet, Lettres Philosophiques, 181. Voigt, Mémoires Minéralog. vol. iii. Mémoire sur la Formation des Vallées.)

[d] Condamine, l. c. p. 134.

[e] Picart, Traité du Nivellement, p. 152, etc. etc.

[f] Brahm. Principe d'Hydraulique, § 208. (en All.)

Herdinxveld and Dort, falls an inch along 1125 feet; but between Dort and the sea, only one inch along 9000 feet.[a] Even the most rapid rivers have less declivity than is commonly imagined. The Rhine between Schaffhausen and Strasburgh, has a fall of 4 feet in a mile; and of 2 feet between Strasburgh and Schenckenschantz. Hence we see the reason why one river may receive another almost as large as itself, without any considerable enlargement of its bed; the augmentation of its body only accelerates its course. Sometimes one river falling into another with great rapidity, and at a very acute angle, will force the former to retrace its course and return for a short space towards its source. This has happened more than once to the Rhone, near Geneva; the impetuous Arva, which descends from the mountains of Savoy, being swollen beyond its usual size, has made the more gentle waters of the Rhone flow back into the lake of Geneva; causing the wheels of the mills to revolve backwards.[b]

Some rivers have no outlet whatever, and the cause is easily discovered; the land having scarcely any declivity, does not impart a sufficiently strong impulse to their waters, which are constantly retarded, and finally absorbed by the sand. Sometimes these waters are evaporated by the heat of the sun, as is the case with the rivers of Arabia and Africa; but they more commonly flow into pools, marshes, or salt lakes.

Rivers which descend from primitive mountains into the secondary lands, often form *cascades* and *cataracts*. Such are the cataracts of the Nile, of the Ganges, and some other great rivers, which, according to Desmarets, evidently mark the limits of the ancient land. Cataracts are also formed by lakes: of this description are the celebrated falls of Niagara;[c] but the most picturesque falls are those of rapid rivers, bordered by trees and precipitous rocks. Sometimes we see a body of water, which, before it arrives at the bottom, is broken and dissipated into showers, like the Staubbach; sometimes it forms a watery arch, projected from a rampart of rock, under which the traveller may pass dry shod, as the "falling spring" of Virginia; in one place, in a granitic district, we see the Trolhetta, and the Rhine not far from its source, urge on their foaming billows among the pointed rocks; in another, amidst rocks of calcareous formation, we see the Czettina and the Kerka, rolling down from terrace to terrace, and presenting sometimes a sheet, and sometimes a wall of water.[d] Some magnificent cascades have been formed, at least in part, by the hands of man: the cascades of Velino, near Terni, have been attributed to Pope Clement VIII.;[e] other cataracts, like those of Tunguska in Siberia,[f] have gradually lost their elevation by the wearing away of the rocks, and have now only a rapid descent.

The elevation of cataracts has generally been exaggerated: that of Tequendama, formed by the Rio de-Bogota, in South America, estimated by Bouguer at 1500 feet, is, according to Humboldt, not quite 600,[g] and the highest fall ever known, that of Staubbach, instead of being 1100, as stated by some travellers, is only 900 according to trigonometrical measurement.[h] When the ground does not form a steep, and almost perpendicular bank, but only a very rapid declivity; and when at the same time the bed of the river is confined by rocks, the waters acquire by compression an astonishing force. Winterbotham relates, that the Connecticut river, in the United States, at 40 leagues from its mouth, is so compressed by rocks, that it carries along on its surface, pieces of lead, as if they were so many corks; and that, notwithstanding the utmost efforts, it is impossible to insert an iron point in its waters: but this appears to be greatly exaggerated.[i]

The periodical rise of the Nile was considered as a singular phenomenon, and one of the greatest mysteries of nature, until modern Europeans, by penetrating into the torrid zone, which was almost unknown to the ancients, discovered that this wonderful property belonged to a great many other rivers besides the Nile. It is now well known that in all the countries situated between the two tropics, it rains incessantly during a certain season of the year. The period varies according to local circumstances, but it is sufficient to know, that the torrid zone, deprived in a great measure of the benefit of snow and glaciers, has this deficiency supplied by copious torrents of rain, pouring down incessantly upon the ground, which has been almost burnt with heat during the dry season. Then all the lakes and rivers swell and overflow their banks.

If a river, under the influence of these tropical rains, flows along a plain, in a direction parallel to the equator, its overflowing waters will spread with a certain degree of equality over the whole extent of its banks. Such, in a great measure, is the case with the Oronoco, in America, the Senegal, and probably the Niger in Africa.

If, on the contrary, such a river flows from a great elevation, from extensive mountains into deep plains and valleys; or, if its direction be perpendicular to the equator, that is, north and south; then, it is evident, that the action of the tropical rains will be extremely unequal in different parts of this river; for it is manifest that the surplus of water will be carried almost entirely towards the lower parts of the territory of the river. This is exactly what happens in the floods of the Nile. This river, as the ancients have said, and notwithstanding the assertions of Bruce, comes from the mountains of the Moon, which probably form part of a central and very elevated plateau, occupying the middle of Africa, and extending especially towards the east and south. In Asia, the rivers Siam and Cambodja, flow in

[a] Velson, Rivierkundige Verhandeling, p. 126, (in Dutch.) Compare Wiebeking, General Hydraulics, (in German.)

[b] Saussure, Voyages, § 16.

[c] The cataracts of Niagara, in their present state, are certainly formed by a river; and would equally exist, if this river had no connexion whatever with a lake. They are caused solely by the sudden change of level in the country over which the river flows.—P.

[d] Herbinis, Dissertatio de Admirandis Mundi Cataractis, suprâ et subterraneis. Amsterdam, 1678, in 4to. Voyages de Fortis, Carver, &c. &c.

[e] Opere di Monsignor Claudio Todeschi, (Rome, 1779,) vol. ii. p. 77.

[f] Isbrand Ides, Voyages au Nord, viii. 54, *sqq.* Muller, Recueil pour l'histoire Russe, viii. 100—118, *sqq.* (in German.)

[g] Bouguer, Voyages au Perou, p. 91. Humboldt, Vues des Cordilliers, p. 22.

[h] Wyttenbach and Wolf. See Storr, Travels in the Alps, i. 114—115, (in German.)

[i] This is one of Hugh Peters' stories, and deserves to be ranked with the celebrated stories of Baron Munchausen.—P.

almost the same latitudes as the Nile, but in a different direction: being from north to south. These two rivers have floods resembling those of the Nile. The Indus, the Ganges, and in general all the rivers which flow between the tropics, present the same phenomenon, with variations arising from local circumstances. No river beyond the torrid zone is subject to regular periodical swellings; the overflowings which occur in the temperate zones depend solely on the melting of the snow in the spring, and on the quantity of rain which has fallen upon the mountains.[a]

The rivers which disappear under ground have excited the wonder both of ancients and moderns. The poets have sung of the Alpheus, which, according to them, passes from Peloponnesus into Sicily, beneath the Ionian Sea, to mingle its amorous waves with those of Arethusa. The ancients have mentioned a great number of rivers which lose themselves under ground, to re-appear in a lower level;[b] but this phenomenon, which most frequently is closely connected with that of subterraneous caverns, has been examined in a rational and sober manner only by the moderns.

When a river is obstructed in its course by a bed of solid rock, and finds beneath it a stratum of softer materials, its waters wear away the softer substance, and thus open up for themselves a subterraneous passage, more or less long. Such are the causes which have formed the *sinking of the Rhone*,[c] between Seyssel and l'Ecluse;[d] the *bridge of Veja*, near Verona, the arch of which has an elevation of more than 114 feet;[e] and particularly the magnificent *Rockbridge* in Virginia, an astonishing vault uniting two mountains, separated by a ravine of 270 feet in depth, in which the *Cedar Creek* flows.[f] It is probable that the fall of a rock has formed some of these natural bridges, like that of Iconozo, in Mexico. In Louisiana, trees, or rather whole forests, have been observed to fall on a river, covering it nearly with vegetable earth; and thus giving rise to a natural bridge, which, for leagues, has hid the course of the river from view;[g] finally, the Guadiana sees its waters scattered and filtered in sandy and marshy grounds, from which they re-issue in greater abundance. France affords, on the small scale, many examples of these disappearing rivers.[h] [i]

Rivers, in running into the sea, present a great variety of interesting phenomena; many form *bars of sand*, as the Senegal and the Nile; others, like the Danube, rush with such force into the sea, that one can for a certain space distinguish the waters of the river from those of the sea. The waters of the little river Syre in Norway, are discernible for a considerable distance, (some say for two leagues) in the sea.[k] It is only by a very large mouth, like those of the Loire, the Elbe, or the Plata, that a river can peacefully mingle with the sea. Rivers even of this nature, however, sometimes experience the superior influence of the sea, which repels their waters into their bed. Thus the Seine forms at its mouth a "*barre d'eau*;"[l] and the Garonne, unable to discharge, with sufficient rapidity, the waters which it accumulates, in a kind of gulf between Bourdeaux and its mouth, exhibits this aquatic mountain, stopped by the flow of the tide, rolling backwards, inundating the banks, and agitating vessels. This phenomenon, termed the "*Mascaret*," is caused by the collision of two bodies of water moving in opposite directions; the tide repelling the current of the river towards its source.[m]

The most sublime phenomenon of this kind which presents itself, is that of the giant of rivers, the Orellana, called the river of the Amazons. Twice a-day it pours out its imprisoned waves into the bosom of the ocean. A liquid mountain is thus raised of the height of 180 feet; it frequently meets the flowing tide of the sea, and the shock of these two bodies of water is so dreadful, that it makes all the neighbouring islands tremble; the fishermen and navigators fly from it in the utmost terror. The next day, or the second day after every new or full moon, the time when the tides are highest, the river also seems to redouble its power and energy; its waters and those of the ocean rush against each other like the onset of two armies. The banks are inundated with their foaming waves; the rocks, drawn along like light pebbles, dash against each other, almost upon the surface of the water which bears them on. Loud roarings echo from island to island. One would say that the Genius of the River, and the God of the Ocean, contend in battle for the empire of the waves. The Indians call this phenomenon *Pororoca*.

The researches which have been prosecuted as to the mass of water which rivers roll along, as well as concerning the space over which they run in a given time, neither having terminated, nor being likely to terminate, in any general and positive result,[n] we shall pass on to the theory of lakes.

Extensive accumulations of water, surrounded on all sides by the land, and having no direct communication with the ocean, or with any sea, are called *lakes*. Lakes are of four distinct kinds.

The *first class* comprehends those which have no outlet, and which do not receive any running water. These *pools* are generally very small, and do not merit much attention. Some of these, as the Arendt, in Altemark, are formed by the sinking down of the circumjacent

[a] Varenius, Géographie Générale, ch. 16. prop. 20. Lulof, Géographie Physique, ii. 262, (in German.) Bergmann, i. 387, *sqq.* (in Swedish.)

[b] Pliny, ii. 103. Seneca Quest. Nat. iii. 26. Strabo, l. ix. 424.; xi. 518, editio Alm. Mœbius, Dissert. de Fluviis, qui intercidunt et enascuntur.

[c] "*Perte du Rhone.*"

[d] Annales des Voyages, iv. 81.

[e] Z. Betti, Descrizione d'un Maraviglioso ponte, 1766. Fortis in the Giornale d'Italia, vi. 241.

[f] Jefferson's Notes on Virginia.

[g] These natural bridges, or rafts, as they are provincially termed, are formed by the lodgment and accumulation of floating trees, generally in the bayous and smaller channels; but on the Red river, such a collection has dammed up the river, and compelled it to spread itself, in a multitude of channels, over a wide surface.—P.

[h] Guettard, Mém. de l'Academie, 1758.

[i] These disappearings and re-appearings of rivers are not uncommon in limestone and chalk countries. The Mole in England, is an example of it in chalk. Many rivers in Carniola disappear in this way, in limestone, and suddenly re-appear in a copious stream. They may even be traced a very considerable distance in the caverns in which they immerge. Such sudden disappearings and re-appearings of large streams are not uncommon in the western U. States.—P.

[k] Pontoppidan, Histoire Naturelle de la Norwege, i. 145.

[l] Literally, a *bar of water;* a swelling and dashing across the mouth of the river, caused by the conflict of the tide and current; called in some rivers "the Bore," and in the Severn, "the Eagre."—P.

[m] "*Barre d'eau refoulée.*"

[n] Riccioli, Géog. Reform. x. c. 7. Lulof, Géog. Phys. § 338—392. Mariotte, Traité du Mouvement des eaux, &c. &c.

lands ;[a] others, like the lake Albano, near Rome, appear to be old craters of volcanos filled with water.

The *second class* consists of those lakes which have an outlet, but which do not receive any running water. Such a lake is formed by a spring, or rather by a multitude of springs, which, placed on a lower level in a kind of reservoir, are obliged to fill that before they find an outlet for their own waters. These lakes are nevertheless fed by little streams of water, almost invisible, which descend from the surrounding lands, or by subterraneous canals. Some great rivers have lakes of this kind for their source. These lakes are naturally situated on great elevations ; there is one of this kind on *Mount Rotondo*, in Corsica, which is 9294 feet above the level of the sea.

The *third class* of lakes is very numerous, consisting of all such as receive and discharge streams of water. Each of the lakes of this class may be looked upon as forming a basin for receiving the neighbouring waters ; they have in general only one outlet, which almost always takes its name from the principal river which flows into it. But it cannot, in strict propriety, be said that these rivers *traverse* the lakes, as their waters mingle with those of the basin over which they are diffused.[b] These lakes have often sources of their own, either near their borders, or in their bottom. There are four or five lakes of this class in North America, which, in point of extent, resemble seas, and which, notwithstanding, by the flow of a continual stream of fresh river water, preserve their clearness and sweetness.

The *fourth class* of lakes present phenomena much more difficult to explain. We mean those lakes which receive streams of water, and often great rivers, without having any visible outlet. The most celebrated of these is the Caspian Sea ; Asia contains a great many others besides. The Niger, if it does not reach the sea, most probably falls into a lake of this kind, and not into a marsh.[c] South America contains the lake Titicaca, which has no outlet, although it receives another very considerable one into it. In short, these lakes appear to belong to the interior of great continents ; they are placed on elevated plains, which have no sensible declivity towards the sea, and which do not permit these collections of water to open for themselves a passage through which they may flow out. But why do these lakes, which are always receiving supplies of water, but have no outlet, why do they not overflow their banks ? We may answer, that with respect to those which are situated in a hot climate, evaporation, as Halley observes, is sufficient to carry off their excess of water. It remains to be determined, whether the reasonings of this philosopher can with justness be applied to a climate so cold for example as that of the Caspian Sea.

Let us, in the first place, observe, that the quantity of water which the rivers pour into this basin, has been exaggerated : there are no other great rivers except the Wolga, the Iaik, and the Kur, which flow into it ; the remainder consists only of small rivulets. We must add, that the whole of the eastern coast scarcely furnishes one rivulet to this extrordinary sea. And let us also remark, (for in physical geography every fact is worthy of attention,) that the Wolga, by no means a deep river, seems to be in part absorbed by the ground which borders its course ; and it is this humidity which renders these lands so distinguished for their fertility, when compared with the neighbouring soil. Finally, were we determined to suppose that there is a disproportion between the extent of the Caspian Sea and its evaporation, on the one side, and the volume of water that it receives on the other, (which we are far from allowing,) we might still take into account the absorption of its waters by the calcareous mountains which border it towards the south and south west. We know how porous and spongy land of this kind is. All accounts agree in describing the mountains to the south of the Caspian as being still more penetrated with moisture, and more abounding in springs than those of Mingrelia, which proves either absorption, or (what we think more probable,) a very strong evaporation. The insalubrity of the air near these lakes, is another circumstance which still farther confirms the opinion of Halley.[d]

The physical phenomena, which certain lakes present, have always excited the astonishment of the multitude. The *periodical lakes* are the most common. Those which are formed by excessive rains, and which are again dried up by the rays of the sun, by evaporation, or infiltration, appear to be scarcely worthy of our attention. In Europe these are nothing but pools, but between the tropics, these pools sometimes cover spaces of several hundred leagues in length and breadth. Such are the famous lakes of *Xarayes* and *Paria*, inscribed on maps of America, and expunged from them by turns ; it is probable that Africa contains a great many of this description. If there exist now in the numerous cavities of the earth subterraneous lakes of this kind, and if these communicate with other lakes which are visible, it is easy to imagine that the waters of these last may sometimes entirely disappear, by sinking down into the basin of the subterraneous lakes in proportion as they dry up. This lower basin again filling itself anew, the waters issue from it to fill the superior basin. If, in such a series of subterraneous cavities, the last link of the chain happen to be a mass of subterraneous water, situated at an elevated level in the bosom of a mountain, the periodical return of the waters in the visible basin may be accompanied by a motion similar to that of spouting fountains. It is by means of such hydraulic machinery that nature keeps up the wonders of the lake of Cirknitz in Illyria, and in many others of the same description.

The alleged regularity of these periodical returns, attributed among others to the lake of Kanten in Prussia, is not supported by authentic testimony. By comparing together the observations made since 1715, upon the Caspian Sea, we are convinced that this great lake augments and diminishes from 30 to 35 feet, according to the abundance of snow and rain in the countries from which it receives its waters ; but we see at the same

[a] Les Mémoires citées dans Kant, Géographie Physique, iii. part 1. p. 92.

[b] Saussure, Voyages, § 10.

[c] The latest discoveries in Africa favour the opinion, that the Niger falls into the ocean in the bight of Benin. Lake Tsad, in Bornou, on the S. frontier of the great desert, receives several rivers, and is not known to have any outlet.—P.

[d] Bergmann, Géographie Physique, i. § 88, ii. § 106.

time, that these changes follow no fixed period.[a] The lakes which are supplied with water by the melting of the snow, may even change their level in the course of the same day, according as the action of the sun has more or less effect upon the neighbouring mountains. It is on this principle, we conceive, that the *seiches*, or periodical risings and fallings of the lake of Geneva, should be explained.[b]

The variations and motions of lakes, which do not depend upon an augmentation of quantity, present very complicated questions: That any lakes communicate under ground with the sea, and owe their regular tides to such communication, is much to be doubted. The equilibrium of the atmosphere, deranged by electricity, or by any other cause, may occasion water to rise up, by altering the pressure which retains it at its level. There is a bay in lake Huron where electric clouds continually remain, and no traveller has ever passed it without hearing thunder.[c d] In Portugal there is a pool near Beja, in Alentejo, which, by its loud noise, indicates the approach of a storm.[e] Other lakes appear agitated by the disengagement of subterraneous gases, or by winds which blow in some cavern with which the lake communicates. Near Boleslaw, in Bohemia, a lake of unfathomable depth, sometimes in winter emits blasts of winds sufficiently strong to raise up in the air pieces of ice several quintals in weight.[f] Two considerable lakes, *Loch Lomond* in Scotland, and the *Wetter* in Sweden, often experience during the serenest weather violent agitations. In the Middle Mark of Brandenburgh, the pool of Krestin often commences in fine weather to boil up in whirlpools, so as to engulph the little boats of the fishermen.[g] Perhaps the decomposition of calcareous stones has an influence upon some of these phenomena.

In the general history of lakes, *floating islands* occupy a great space in the writings of some geographers. But when, on the one hand, we consider how many inaccessible marshes there are always floating in the water, and notwithstanding, covered with brushwood, and even trees; and on the other hand, when we consider those beds of vegetables, those immense forests that are found buried, and very recently buried, in turf pits, we may then easily form an idea of these *floating islands* which some geographers represent as wonders of nature. They are simply earth of the nature of peat, but very light, sometimes only reeds and roots of trees interwoven together. After having been undermined by the waters, they detach themselves from the bank, and from their lightness and spongy consistency, joined to their great extent and inconsiderable thickness, they remain suspended and floating on the surface of the waters.[h]

The delightful *Loch Lomond*, in Scotland, contains some of these floating islands, which are not very uncommon in Scotland or Ireland. A small lake in Artois, near Saint Omer, is covered with similar islands. The marshy lakes[i] of Comacchio present a great number.[k] The most considerable that are mentioned, are those of the lake of Gerdau, in Prussia, which furnish pasturage for 100 head of cattle; and that of the lake of Kolk, in the country of Osnabruck, covered with beautiful elms.[l]

There are some floating islands which appear and disappear alternately. The lake Ralang, in Smaland, a province of Sweden, encloses a floating island, which, from 1696 to 1766, had shown itself ten times, generally in the months of September and October.[m] It is 280 feet long, and 220 broad. There is an island similar to it in Ostrogothia.

Floating islands may have an influence upon the formation of the globe. Those which Pliny and Seneca saw floating in the lakes of Bolsena, Bressanello and others, have become fixed. East Friesland has a subterraneous lake, which appears to have been covered with floating islands, that gradually united together, and ended in the formation of a solid crust.[n]

The shade of thick forests, or high mountains, may prevent certain lakes, like Loch Winnoch in Scotland, from getting rid of the perpetual ice which covers them in whole or in part. Other lakes, always ruffled by the winds, or stirred by the rivers which they receive, and the springs which feed them, brave all the rigours of a cold climate. The most extraordinary phenomenon would be to see lakes freeze during summer, and this has been related of some in China, the cause of which has been sought for in the saline nature of the neighbouring ground; but the fact appears to have been insufficiently observed, or incorrectly recorded.[o]

The *depth* of lakes varies infinitely, and cannot form a subject of general physical geography. We must be satisfied merely with contradicting the popular opinion, that there are lakes without a bottom. Those which have been considered as such owe this character solely to the existence of currents which carry along with them the lead attached to the sounding line. But we must not reckon as fabulous the accounts of lakes with double bottoms, which are said to be found in Jemptia or Jemptland, in Sweden, and elsewhere.[p] It has been supposed, that a crust interwoven with roots, similar to the floating islands, may exist at the bottom of a lake, and by either rising or sinking, may make the depth vary in appearance.

Such are the principal observations we have to make upon the origin and motion of springs, rivers, and lakes. We are now to consider them with relation to their chemical nature. We have already remarked the property which water possesses of absorbing atmospheric air. It is estimated, that fresh water generally holds in solution $\frac{1}{50}$ of its weight of air. A certain time is necessary be-

[a] Rytchkow. Topography of Orenbourg, (in German,) i. 166, 167. Pallas, Travels in the South of Russia, i. 434. (in German.)

[b] Jallabert, Mémoires de l'Academie des Sciences de Paris, 1741, p. 32. Compare Saussure, §§ 20—25.

[c] Carver, Voyage dans l'interieur d'Amerique, etc.

[d] It is the opinion of Schoolcraft, that this remarkable electricity of the atmosphere, at Thunder Bay, is not founded in fact. The country around it is low, and there is nothing peculiar in the composition or exhalations of its soil.—P.

[e] Burges, cited by Bergmann, Geog. Phys. § 99.

[f] Acta Erudita, 1682.

[g] Bernouille, Archives des Voyages, i. 325.

[h] Pliny, Natural History, ii. c. 95.

[i] "Lagunes."

[k] Girolamo Silvestri, Treatise on Floating Islands, ancient and modern, (in Italian.)

[l] Kant. Géographie-Physique, ii. part i. p. 114.

[m] Bergmann, Géographie Physique, ii. 238.

[n] Annals of the Prussian Monarchy, 1799, p. 292, (in German.)

[o] Mémoires de l'Academie des Sciences, 1712

[p] Bergmann, § 93.

fore it becomes saturated with air, and all the elements of atmospheric air are not absorbed by water with equal readiness. Pure oxygen unites most easily with it. The good quality of fresh water consists in being completely saturated with oxygen, which must be frequently renewed by the running and agitation of the water. Its bad quality arises either from the alteration, or the superabundance of the oxygen; and each of these states announces the presence of a heterogeneous substance in water, capable of absorbing more oxygen, or of altering it. These heterogeneous substances are earthy salts, sulphur, lime, gravel, and mud.

These principles, completely established by modern chemistry, would lead us to believe that the influence of *local* exposure upon the nature of waters is as powerful as Hippocrates has represented it.[a] Waters exposed to the *rising sun*, says he, are limpid, inodorous, soft, and agreeable to drink, because the sun at its rising corrects them by dissipating the fogs of the morning which might have mingled with them. Waters lying towards the *setting sun* are destitute of this advantage, and are not limpid. Those which flow towards the *south*, and are exposed to hot winds, should be brackish, not very deep, and consequently hot in summer and cold in winter, and likely to enervate man, and to render him liable to several maladies. Lastly, waters having a *northern* exposure, should in general be cold, hard, and unpleasant, the use of them dries up the milk of women, and renders them barren. Such is the system of Hippocrates; but we ought not, with the blind admirers of that eminent physician, to extend its application too widely; for it is connected with his ideas upon the particular nature of winds, and these ideas contain only local truths, applicable to Greece and Asia Minor.

The waters of marshes, pools, and all those which stagnate on the ground, are unwholesome; they dissolve azotic and hydrogen gases, arising from the decomposition of plants, insects, and fishes. The surrounding atmosphere is loaded with these noxious gases. They who live near marshes, and who drink the waters, lead a miserable life, never acquire strength, and prematurely feel all the infirmities of age.

In Salogne, (in France,) to go no farther in quest of an example, the stagnant humidity gives to the natives pale countenances, languishing eyes, and a weak voice.[b]

Stagnant waters almost always absorb a great quantity of fixed air, or carbonic acid gas; for this gas is carried by its gravity towards the surface of the waters, and does not disengage itself.

The *water of hills and mountains*, differs in its quality, according as it filters through banks of pure rock,[c] of schist, of quartz, or of sand, from all which substances it can scarcely derive any property whatever;—or, as it flows over beds of *potter's earth*, which it neither draws along with it nor dissolves;—or, lastly, as it traverses ground which is calcareous, marly, gypseous, impregnated with magnesia, salt, or bitumen. Waters of the kind last mentioned are always very much mixed with heterogeneous substances, and are generally hard, turbid, and unwholesome, at least if daily used. Hippocrates, Homer, and Plutarch, have long ago condemned the use of them.[d] Those waters which have clayey bottoms are the most common; they unite those qualities which are essential to salubrity. Those which flow from the hard rock are still more pure and limpid, above all when they undergo a process of filtration in wearing their way over a stony bed.

The waters of *lakes* being derived from springs and rivers, partake of their different qualities. There are some lakes whose waters are extremely limpid, such as the lake of Geneva, and that of Wetter in Sweden; in the latter, a farthing may be perceived at the bottom of the lake at 120 feet depth; but the lakes whose waters are stagnant, or saline, or bituminous, may be looked upon as equally unwholesome with those of marshes.

The *waters of rivers* contain some very heterogeneous elements, which seem necessarily to counteract each other; and it is, perhaps, as much owing to this reciprocal destruction of pernicious principles, as to continual motion, that river water is so generally serviceable to the wants of man, and supports the freshness and purity of the atmosphere wherever it flows. It often, however, forms a sediment of gravel and mud; and Hippocrates imagined, that, when used as a constant beverage, it produced among other maladies, that of the stone.[e]

Well water, by remaining too long motionless, frequently acquires the bad qualities of stagnant waters.

Sea water acts as an emetic with us, but the inhabitants of Easter Island, in the Pacific Ocean, make it their common beverage.

Among the *atmospheric waters*, those composed of *rain* are the most wholesome on account of their softness, purity, and lightness. Hippocrates has justly observed the admirable process which nature employs in distilling the vapours raised from the earth by the action of the sun. These vapours are agitated and rolled about in all directions; their more earthy and turbid parts separate, and, sinking by their own weight, form fogs;[f] the remainder, more subtile and more light, is still more completely dissolved by the solar heat. It is of this remainder that the drops of rain are formed. But the first rain that falls after a long drought, in passing through the air, becomes charged with a great number of heterogeneous substances, and consequently gets very impure before it reaches the earth. The rains which follow are not subject to this inconvenience, but all rain water is liable to be soon corrupted.

Snow and ice water have an origin very different from that of rain water. For snow and ice being formed by the absence of caloric, are consequently destitute of the more subtile parts of water. The water, therefore, into which these substances dissolve, ought to be harder and heavier than that of rain. According to the most au-

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[a] Traité des Airs, des Eaux, et des Lieux, § 9, 20, 22, 25. Edit. de Coray.

[b] Mémoire de la Société Royale de Medicine, 1776, p. 61—72.

[c] "*Roche vif.*" Rocks which penetrate to a great depth, hard, and free from earthy particles, and not arranged in beds or strata; such as granite, porphyry, &c.—*Dict. del' Acad.*

[d] Hippocrates, l. c. § 35. et le Commentaire de Coray, p. 107.

[e] Hippocrates, l. c. § 51, et le Commentaire de Coray, 134.

[f] Fogs are nothing but vapour condensed by cold, and are identical with clouds, differing only in their position. They are more generally formed on mountains than on extensive plains, which could not be the case if they consisted of the more earthy particles.—P.

thentic accounts, the use of such water occasions swellngs in the throat and other tumours.[a]

The more water is mixed, the heavier it is. The following comparative statements are taken from Bergmann.

Distilled water weighs, - - -	1000 . . . .
Spring water of the purest kind, -	1001 to 1005
River water, - - - - -	1010 . . . .
Sea water, - - - - -	1012 . . . .
Stagnant water, - - - -	1102 . . . .

After having considered the qualities of common waters, we shall now make some observations upon *mineral waters*, that is to say, those waters which are combined with certain substances of the mineral kingdom, in a quantity sufficiently considerable to give them both taste and colour, properties, the absence of which, constitutes the essential and distinguishing characteristic of fresh water. These extraneous substances are either found in a state of very subtile mechanical division, or in that of a complete chemical solution. It is extremely difficult, even by the most careful analysis, to ascertain exactly the proportions in which they are combined.[b] They can, therefore, only be classed in a manner far from being strict. Acids easily combine with water, but they as rapidly incorporate with any saline, earthy, or metallic substance, so that *acidulated* or *gaseous waters* scarcely ever contain free unmixed acid. The spring of Latera, 32 miles from Viterbo, and that of Selvena, 46 miles from Sienna, are produced as examples in which the free sulphuric acid is combined with water.[c] The lakes of Cherchiaio, of Castel Nuovo, and Monte Rotondo, also in Italy, present the free boracic acid ;[d] but these are rare cases. Carbonic acid is met with, almost free, in the spring, called *Sauerling*, near Carlsbad in Bohemia.[e] The waters of this spring contain a quantity of the acid equal to their own volume ; those of Selz or Seltzer, commonly contain only $\frac{4}{9}$; those of Pyrmont $\frac{3}{8}$; and, those of Spa $\frac{1}{4}$.

The acidulated *ferruginous* or chalybeate waters are the most common. We could reckon some hundreds in France and Germany. The acid in these is combined with ferruginous ochre : we also find magnesia, glauber salts, vegetable alkali, muriate of soda, and other substances, so that an imitation of them is very easy. Bergmann made some forty years ago for his own use, and that of his friends. The simple chalybeate waters, such as those at Forges and Aumale, are still more common. Those of Passy contain vitriol or sulphate of iron, and become black with astringent vegetables. *Bitter waters* are charged with sulphate of magnesia ; such are those of Seidlitz and Epsom. The steppes of Siberia, to the north-east of the Caspian Sea, have a number of lakes of this kind. They almost form a chain from the Kuma and the Lower Wolga, reaching beyond the Jenissei.[f] Near these pools there are some which contain natron or carbonate of soda.[g] In the plains of Hungary the same abundance of bitter waters is found. Perhaps this is a property common to all the basins of ancient mediterranean seas. *Aluminous* waters are not very numerous ; we mention only those of Bath in England, of Crems and of Halle in Germany,[h] and two or three in Russia. The *soapy* springs owe their properties to a small proportion of clay, which often floats on the surface like grease.

The formation of the acidulated waters is one of those daily operations of nature, which has been subjected to the scrutiny of science. Running waters find, in the bosom of the earth, acidiferous substances, the acids of which either disengage themselves by their affinity to water, or by the fermentation which a stronger acid causes among the weaker acids. This chemical process is perpetually renewed. Limestone, which contains two-fifths of its weight of carbonic acid, supplies, in abundance, mineral waters with this acid, which constitutes their general basis.[i] Sulphuric acid is disengaged from pyrites, which are very widely distributed over the earth.[k] Waters impregnated with this acid, will dissolve iron, lime, magnesia, in a word, almost all substances. Silex itself, which for a long time was considered as insoluble in water, is, however, found dissolved, not only in the boiling water in the neighbourhood of volcanos, as in the springs of Geyser and Raikum in Iceland, but also in springs of a moderate temperature, and even in common water.[l] It was at first imagined, that silex became soluble only by its combination with the mineral alkali, as in the Geyser ; but it has been proved that it is soluble by itself. Mineral waters do not remain in that state, in which a first chemical operation placed them ; in their flowing or filtering, they sometimes meet with a salt, and sometimes an acid ; and these different substances, by uniting, separating, or changing, according to their affinities with the basis of mineral waters, communicate qualities to them, which serve to vary to infinity their chemical and medicinal nature.

We must not imagine that these combinations are all of them salubrious. Without mentioning those sulphurous or carbonic fumes which arise from several waters, it appears very certain that there are several springs impregnated with arsenical and mercurial vapours. But, in general, they have wisely buried under piles of stones, these frightful laboratories, where nature herself plays the part of a poisoner.[m] According to Bergmann, arsenic, before it can be dissolved, requires 14 or 15 times its own weight of hot, and 90 times of cold water,[n] —a circumstance which, joined to the rare occurrence

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[a] Forster, in Comment. de Reb. in Scient. Natural. et Medic. Gestis, xxiv. 224. Comp. ibid. Suppl. Decad, i. p. 453.

[b] Bergmann, Géog. Phys. § § 73, 74, 57. Id. de Analysi aquarum in Opusc. Chimico-Phys. i. Hydrologie de Wallerius, (in Swedish ;) de Monnet, (in French ;) d'Otto, (in German.)

[c] Vandelli, de Thermis agri Patavini. Bergmann, i. 346.

[d] Lavoisier, Traité Elémentaire de Chimie, i. 266. Fourcroy, Elémens de Chimie, i. 500.

[e] Klaproth, Mém. de Chimie, i. 320.

[f] Georgi, Description de la Russie, iii. 23—26.

[g] Natron is found effervescing on the surface of certain dry and warm soils, in layers resting on clay, &c., and in crusts deposited by the waters of certain lakes. It is found in the first and last form in Hungary, in the second in Fezzan and Buenos Ayres, and in the third in the natron lakes of Western Egypt.—P.

[h] Richter in Crell. Annal. de Chimie, 1788, No. iv. p. 324.

[i] Bergmann, Géog. Physique, i. 370.

[k] Klaproth, Mém. de Chimie, i. 316.

[l] Bergmann, Dissertation sur la Source d'Upsala. Klaproth, Mém. de Chimie, i. 340, *sqq.* 319.

[m] Varenius, Géographie Generale, ch. 17. prop. 12.

[n] White arsenic, or arsenious acid, is but slightly soluble in cold water. 1000 parts of cold water dissolve 2½ of the arsenic, but 1000 parts of hot water dissolve 77½ parts. *Klaproth.*—P.

of this destructive mineral, renders arsenical springs extremely uncommon.

There are also *simple metallic waters*, that is to say, those in which minute particles of metal are suspended, and which, not being combined with the fluid, are gradually deposited. Besides the common cementatory waters, as they are termed, which yield iron and copper, some are mentioned which have formed a deposite of argentiferous lead in a mine of Kongsberg. The auriferous rivers do not even retain the particles in suspension; they roll along grains of gold detached from some rock. These waters are not mineral in the proper sense of the word.

Salt waters, or, to use the modern term, *muriated* waters, are perhaps the most common of all; but they rarely exist in a state of perfect purity. They occur in abundance along the Carpathian and Uralian mountains, and in general in the zone comprised between the 50° and 30° parallels of northern latitude. More to the north they are hardly ever found; farther towards the south, crystallized salt abounds indeed in certain regions, as in the great desert of Africa; but we find only a few salt springs there. It is equally in the temperate zone of the north that the *salt lakes* are abundant. The central part of Asia has a vast number of them.[a]

Whence comes that saline quality which generally characterizes stagnant lakes? Some say that the soil in the neighbourhood has been originally impregnated with salt. This no doubt is one way of removing the difficulty: it would, however, be no easy matter to point out the enormous beds of salt which this hypothesis necessarily requires. Others consider all these salt lakes as the remains of the ancient ocean, which, in order to substantiate our *theories of the earth*, must be supposed to have formerly covered the globe. But why should the ocean have particularly affected these regions? Why are not all lakes left salt and brackish from the same cause? It is the opinion of very able and accurate observers, especially of Halley,[b] that all the lakes which receive a great quantity of fresh water, and which are in a state of stagnation, must have a brackish or salt taste, from the corruption of their waters, and from the decomposition of animal and vegetable substances which the rivers carry thither. There is only one objection to which this opinion is liable. We may ask, why do not the saltness, and especially the bitterness of these lakes progressively augment? But is it not possible in some measure to unite these three opinions? We will grant that the ancient sea did cover those countries; and we will suppose it to have disappeared from the influence of absorption or evaporation, and not in consequence of any efflux either sudden or slow. We shall then say, that certain soils being more compact, more glutinous, more cold; in a word, soils constituted in a particular manner, would be able to retain in greater quantity the saline particles of the ancient sea, which were already crystallized; finally, the decomposition of fresh waters, and of animal or vegetable substances, so far as it goes, ought to produce salt. With respect to the question, why the saltness does not increase, it would be wiser perhaps to acknowledge, that the causes of this circumstance are not known.

The heat which *sulphureous waters*, or those charged with sulphuretted hydrogen gas generally experience, has been explained in different ways. Common opinion attributes this phenomenon to the decomposition and combustion of the pyrites over which the waters pass; but it may be just as possible, that beds of burning coal may act an important part here.[c] Whatever the cause may be, hot springs are certainly one of the most curious phenomena in physical geography: their heat rises sometimes to an astonishing degree. The spring of Krabland, in Iceland, mounts even to 103 degrees of the centigrade thermometer of Celsius.

The most magnificent of these springs are the great *Geyser* in Iceland, which rises up in the form of a pyramid of water and foam, more than 100 feet high; and the *Strok*, in the vicinity of the Geyser, that spouts up like a stream of water from a pump, to a still greater height.[d] This polar island beholds rivulets of hot water laving its shores, which are girdled with floating ice.

There are some waters which are capable of taking fire without being hot. Sometimes they contain inflammable or hydrogen gas, disengaged from ores of iron, zinc, and tin, dissolved by the sulphuric and muriatic acids. Such are the fountains of Porretta-Nuova, Barigazo, and others; such is the rivulet near Bergerac, which can be set on fire with lighted straw.[e] Sometimes these waters are mixed with pitch, or bitumen, especially with naphtha and petroleum, which in general float on the surface, and burn in the midst of the water; this is seen at Baku, and in several places in Persia. The burning lake of Iceland appears to belong to the first class, and it is not improbable that it may have sometimes taken fire of itself.[f] Persons deserving of credit assert, that they have seen the *ignis fatuus* fluttering on the surface of the lake Wetter in Sweden.

Incrusting waters ought to be carefully distinguished from those possessed of a *petrifying* property. These last, charged with siliceous particles extremely minute, penetrate the pores of wood and other substances, and substitute for the elements of these bodies, other crystallized elements arranged in the same manner. This property shows itself stronger than any where else in *Lough Neagh* in Ireland, and in some few springs;[g] but most waters possess it in a certain degree. The Danube and the Pregel petrify, in the course of some ages, the stakes which are planted in them.[h]

[a] Salt lakes and salines are generally found in those extensive sandy deserts formed by the new red sand-stone. They are particularly abundant in this formation, in the sandy deserts stretching along the E. base of the Rocky Mountains.—P.

[b] Philosophical Transactions.

[c] Klaproth, Mém. de Chimie, i. 313.

[d] See afterwards the Description of Iceland.

[e] Mémoires de l'Académie des Sciences de Paris, 1699, p. 26.

[f] Several springs have been found in the secondary formations, W. of the Alleghany Mountains, which, although perfectly limpid, emit an inflammable gas, which takes fire by bringing a flame near the surface. Springs impregnated with bitumen, which floats in large quantities on the surface, are also found there, particularly along the Alleghany river. They are probably connected with the coal mines.—P.

[g] Bruckmann, Magasin de Hambourg, ii. 156, iv. 503, etc.

[h] The siliceous deposites and incrustations, around the Geyser, are probably derived from silex held in solution by the peculiar chemical quality of the waters. It there invests grass, leaves, and rushes. Trees buried in sand, are sometimes converted into a siliceous mass, generally chalcedony: such specimens are frequently found in the low country of the Southern States, among others, of the pine and live oak.—P.

Incrusting waters act in a more evident manner, by depositing like a crust the earthy particles with which they are loaded. The spring of Guancavelica, which by depositing calcareous sediments, furnishes the rough stones of which the neighbouring towns are built; the beautiful alabaster formed by the baths of St. Philip, in Tuscany, and by a hot spring near Tours; the deposites, known under the name of *sugar-plums of Tivoli;* the magnificent basin which the springs of Carlsbad have constructed for themselves, and many more examples might be referred to; but it would be unnecessary and superfluous to illustrate so simple a fact. Let us rather observe, that this quality of incrustation, belonging more particularly to hot springs, is likewise found in several that are cold.[a] The ordinary deposites consist of calcareous tufa. The Geyser deposits a siliceous tufa.

These observations may suffice for tne theory of the fresh waters and mineral waters collected upon the surface of the dry land. A more extensive scene now invites us, the immensity of the ocean.

[a] Calcareous incrustations are generally formed around carbonated springs, holding lime in solution. Some of the springs, at Saratoga, have in this way, formed a natural curb around their outlets. Most of the calcareous tufas are formed in this way. The rock at Guadaloupe, in which a human skeleton was found imbedded, is a similar tufaceous deposite, of very recent formation.—P.

BOOK XIV.

Continuation of the Theory of Geography. Of the Sea, and Sea water. Of Tides and Currents.

The sea is one of the most important subjects of physical geography. The ocean, by its exhalations, which refresh and moisten the air, supports vegetable life, and furnishes the necessary supply to those valuable canals of running water, which, though constantly flowing, never become empty. Without the kindly influence of these vapours, which every moment escape from the surface of the sea, all the earth would languish like a desert; the drying up of the ocean, whether slow or rapid, would probably be sufficient to reduce all organized nature to a state of annihilation. That vast mass of water is equally useful for absorbing and decomposing a great quantity of noxious gas, and of animal and vegetable remains. The ocean too, by affording increased facilities to commerce, secures the advantages of neighbourhood to nations which so many lofty mountains and so many rapid rivers seemed to have separated for ever from each other.

We have treated of the *varied appearances* of coasts which form the common boundaries of sea and land. As to the bottom of the basin of the sea, it seems to have inequalities similar to those which the surface of continents exhibits; if it were dried up, it would present mountains, valleys, and plains. It is, moreover, inhabited almost throughout its whole extent, by an immense quantity of testaceous animals, or covered with sand and gravel. It was thus that Donati found the bottom of the Adriatic sea; the bed of testaceous animals there, according to him, is several hundred feet in thickness.[a] The celebrated diver Pescecola, whom the Emperor Frederic II. employed to descend into the strait of Messina, saw there with horror, enormous polypi attached to the rocks, the arms of which, being several yards long, were more than sufficient to strangle a man.[b] In a great many places, the madrepores form a kind of petrified forest, fixed at the bottom of the sea, and frequently too, this bottom plainly presents different strata of rocks and earth. Granite rises there in sharp pointed masses. Near Marseilles, marble is dug up from a submarine quarry.

There are also bituminous springs, and even springs of fresh water, that spout up from the depths of the ocean; and in the gulf of Spezia, a great spout or fountain of fresh water is seen to rise like a liquid hill.[c] Similar springs furnished the inhabitants of the town of Aradus with their ordinary beverage.[d] On the southern coast of Cuba, to the south-west of the port of Batabano, in the Bay of Xagua, at two or three miles from the land, springs of fresh water gush up with such force in the midst of the salt water, that small boats cannot approach them with safety; the deeper you draw the water the fresher you find it.[e]

It has been observed, that in the neighbourhood of steep coasts, the bottom of the sea also sinks down suddenly to a considerable depth, whilst near a low coast, and one of gentle declivity, it is only gradually that the sea deepens.[f]

There are some places in the sea where no bottom has yet been found. But we must not conclude that the sea there is really bottomless; an idea, which, if not absurd, is at least by no means conformable to the analogies of natural science. The mountains of continents seem to correspond with what are called the abysses of the sea; but the highest mountains do not rise to 20,000 feet.[g] It is true, that they have been wasted down and lessened by the action of the elements; it may, therefore, be reasonably concluded, that the sea is never beyond 30,000 feet in depth; but it is impossible to find the bottom even at one third of this depth with our little instruments. The greatest depth that has been tried to be measured, is that found in the northern ocean by Lord Mulgrave; he heaved a very heavy sounding lead, and gave out along with it cable rope to the length of 4680 feet, without finding the bottom.

The level of seas is, generally speaking, the same every where. This arises from the equal pressure in every direction which the particles of a fluid exercise upon each other. The ocean considered as a whole, has then a spherical, or rather a spheroidical surface, which may be considered as the true surface of our planet. The only exception to this position, may perhaps be found in gulfs and inland seas, which have only a slight communication with the ocean. In these parts of the sea, the level of the water may sometimes be a little more elevated than in the ocean. It is alleged that the Dutch found the level of the gulf of Zuyderzee considerably higher than the North Sea.[h] It appears more probable, that the Arabian Gulf is more elevated than the Mediterranean, and that in general, small portions of sea, open only to the east, have a higher level on account of the accumulation of the waters driven into these gulfs, as into an alley, without an outlet, by the general movement of the sea from east to west, a movement of which we shall hereafter speak. There are also mediterranean seas where the level of the waters changes with the seasons. The Baltic and Black Sea swell in the spring from the abundance of waters which the rivers bring along with them. These two interior seas approach the nature of lakes, which have generally a higher level than the ocean.

Sea water contains, besides pure water, several extraneous substances, in proportions which vary in different

[a] Donati, Storia Naturale Marina del Adriatico. Marsigli, Histoire Physique de la Mer.
[b] Kircher, Mundus Subterraneus, l. ii. c. 15.
[c] Spallanzani, Journal de Physique, July, 1786.
[d] Strabo, Geog. 1. xvi. p. 753, edit. Casaub. 2°. Comp Pliny, Hist. Nat. v. 31. ii. 103.
[e] Humboldt, Tableaux de la Nature, i. 235.
[f] Dampier, Voyage round the World, ii. 119. Pontoppidan, Natural History of Norway, i. 109, (in Danish.)
[g] French measure, corresponding to 21,315 Eng. feet nearly. Height of Chimborazo, 21,440 feet Eng.; that of the highest peak of the Himalayas, estimated at 27,677 feet.—P.
[h] Varenius, General Geography, p. 101, edit. of Newton.

places. Muriatic, or marine acid, vitriolic, or sulphuric acid, fixed mineral alkali, magnesia, and sulphate of lime, are in general the substances contained in it. By boiling or by evaporation in the open air, common salt is obtained, (muriate of soda,) which is preferred for salting meat, to the salt of springs. The saltness and bitterness of sea water, renders it disagreeable to the taste, and unfit for the use of man.

The saltness of the sea seems in general to be less towards the poles, than under the equator. There are, however, exceptions in certain countries, and generally in all gulfs which receive a great many rivers. The following observations upon this subject are from Bergmann.[a]

Near Iceland, the sea contains of salt,	. .	$\frac{1}{12}$ to $\frac{1}{10}$ of its wt.
Near the coasts of Norway, North Sea,[b]	. .	$\frac{1}{10}$ - $\frac{1}{4}$
In the Kattegat, near Warberg,[c]	. . . .	— - $\frac{1}{16}$
In the Baltic Sea,	. . . . .	— - $\frac{1}{30}$
In the gulf of Bothnia,	. . . . .	$\frac{1}{40}$ - $\frac{1}{30}$
In the N. Sea, Near Northumberland,	. .	— - $\frac{1}{30}$
In the N. Sea, Near the Thames,	. . .	— - $\frac{1}{29}$
In the N. Sea, Upon the coast of Holland,		— - $\frac{1}{32}$
In the Irish Sea, near Cumberland,	. . .	— - $\frac{1}{40}$
In the English Channel,	. . . . .	— - $\frac{1}{30}$
In the Atlantic Sea, Coasts of France,	.	— - $\frac{1}{32}$
In the Atlantic Sea, Coasts of Spain,	. .	— - $\frac{1}{46}$
In the Mediterranean, Near Castiglione,	.	— - $\frac{1}{21}$
In the Mediterranean, 5m. to the N. of Malta,		— - $\frac{1}{27}$

Sea water is in several places less salt at the surface than at the bottom. In the straits of Constantinople, the proportion is as 72 to 62; in the Mediterranean, as 32 to 29. It has been found, says Bergmann, that in the Œresund, the water taken at the surface, and from the depths of 5 and 20 fathoms, was in proportion to melted snow water, as 10,047, 10,060, and 10,189 to 10,000. Water ought to be denser and heavier at a certain depth, and from the result of experiments, in which a pressure has been applied to it, equal to what it sustains 1800 fathoms from its surface, it has been computed that at that depth it should be compressed $\frac{130}{1000}$ by its own weight. Sea water, in acquiring additional saltness, seems, at a certain depth, to lose its bitterness; so, at least, it appears from the observations of Sparrmann, who took up a bottle of sea water from the depth of 60 fathoms, and found it had the taste of fresh water, in which common salt had been dissolved. According to chemical analysis, it had very little magnesia.[d]

Sea water experiences great changes from the agitation of the waves, from the variations of seasons, and from the action of the currents. Near Walloë, in Norway, where there is a salt-pit, it has been remarked, that the sea water taken at the surface contains $\frac{1}{24}$ of its weight of salt at the moment the ice is detached, which extends 30 feet down; whilst the salt in every other season is in the proportion only of $\frac{1}{30}$. Upon the coasts of Cumberland, in England, a still stronger evaporation is experienced, as there is generally $\frac{1}{45}$ of salt in the sea water, which is sometimes reduced by excessive rains to $\frac{1}{50}$. Upon the coast of Malabar, the sea water sometimes becomes drinkable.[e] In the Sound, the waters change their weight and saltness with the winds and currents: when they come from the east, the water weighs only $\frac{47}{1000}$ more than melted snow; on the contrary, when they come from the west, it weighs $\frac{126}{1000}$. It is supposed that in Iceland the sea is more salt during the flow than the ebb of the tide, whilst in the Gulf of Bothnia, it is quite the contrary; for the inhabitants know by the progressive increase of the saltness during the ebb, the moment when the flow approaches. In this gulf, the saltness of the sea is in general greater towards the winter, and less towards the summer solstice, which unquestionably arises not only from the flowing of the rivers, but also from the melting of the ice.[f]

It is easier to perceive the great advantages resulting from the saltness of sea water, than to discover its origin. Without this saltness, and without the agitation in which they are continually kept, the waters of the sea would become tainted, and would be infinitely less adapted for the motion of vessels, and probably it is to this that many of the inhabitants of the ocean owe their existence. But whence comes this saltness? Is it from beds of salt lying at the bottom of the sea? These beds themselves appear rather to consist of deposites which the sea has formed by precipitation. Does the saltness originate from the corruption of river water? It seems, in fact, that the fresh water which is discharged into close and stagnant lakes becomes corrupted, decomposed, and forms deposites of salt. Now the ocean may be considered as a great lake, the common reservoir of all terrestrial waters. But in this case, it is said, that the saltness should increase from day to day. Halley, who broached this opinion,[g] wishes that experiments were made which, in future ages, might conduce to throw light on the subject. Several modern philosophers consider the sea as the residuum of a primitive fluid, which must have held in solution all the substances of which the globe is composed; that these mother waters having deposited all the earthy, acid and metallic principles with which they were impregnated, there remains in their residuum, (which is the present sea,) some of these elementary principles too intimately combined with water to escape from it; and with respect to the bitterness of sea waters, as it diminishes in proportion to the depth, it can arise only from the great quantity of decomposed and putrifying animal and vegetable substances which float in the ocean, and which the running waters never cease to bring into it.

Various methods have been employed to render sea water drinkable. The only one which has succeeded is distillation; but it requires too much care, and too much fuel to be made use of frequently, or on a large scale. Even distillation does not divest sea water of all its bitterness, when it contains sal ammoniac. Thus mariners, though sailing in the midst of water, often see themselves exposed to all the horrors of dying of thirst when their stock of fresh water has been exhausted.

[a] Physical Geog. i. 431. Comp. Ingenhousz, Experiments upon Vegetables, p. 284.
[b] Hierne, Tentam. Chem. ii. 178.
[c] Swedenborg, Miscel. Observat. 103.
[d] Bergmann, dans la Magasin de Physique de Gotha, ii. cah. i. p. 92—101. (2d edit. German.)
[e] Duhamel, Philos. Burg. cited by Bergmann, i. 434.
[f] Palmstruck, a Swedish officer, cited by Bergmann, l. c.
[g] Philosophical Transactions, No. 334

But should they be fortunate enough to fall in with floating or fixed ice, pieces of it, when melted, afford them water which is fresh, although a little insipid.[a]

The *colour* of the sea varies very much in appearance, but it is generally of a deep bluish green, which becomes clearer towards the coasts. This apparent colour of the sea seems to arise entirely from the same causes which impart a blue shade to distant mountains, and which give the atmosphere its azure hue. The rays of blue light, being the most refrangible, pass in the greatest quantity through the aquatic fluid, which, in proportion to its density and depth, makes them undergo a strong refraction.

The other shades in the colour of sea waters depend on causes which are local, and sometimes illusory. It is said that the Mediterranean Sea, in its upper part, has sometimes a purple tint. In the gulf of Guinea, the sea is white, and around the Maldive islands black. The Vermeille, or Vermillion sea, near California, has received its name from the red colour which it often assumes. The same phenomenon was observed at the mouth of the river Plata, by Magellan, and also in other places.

It is not impossible that a great number of certain insects may, for some time, give a reddish or whitish tint to an expanse of sea. The infusion of certain earthy or mineral substances, the nature of the soil, and other causes, may produce these appearances.

The green and yellow shades of the sea arise from marine vegetables. In some places, these vegetables have been observed to rise to the surface of the water, and cover it entirely, as between the Canary and Cape De Verd Islands, in that part of the sea,[b] which the Dutch call *Kroos-zee*, and the Portuguese *Mare di Sargasso*.[c] This marine vegetation presents, upon a large scale, phenomena similar to the *efflorescence upon lakes*.[d] In the lakes, there are very delicate water mosses[e] covered with hair, which rise during the day to the surface of the water, and often sink beneath it during the night.

The *light*, or *sparkling of the sea*, is a magnificent and imposing spectacle. Sometimes the vessel, while ploughing her way through the billows, appears to mark out a furrow of fire; each stroke of the oar emits a light sometimes brilliant and dazzling, at other times tranquil and pearly. These moveable lights are grouped in endless varieties. Here thousands of luminous points, like little stars, appear floating on the surface; and then, multiplying together, form one vast sheet of light. There the scene becomes more tumultuous, the refulgent waves heave up, roll, and break in shining foam. At other times, we see large sparkling bodies resembling the forms of fishes, pursuing each other, disappearing, and bursting forth anew.

The explanation of this phenomenon has very much occupied the attention of philosophers. Valisneri, Rigaud, and Dicquemare,[f] have shown, that, on a number of occasions, this light was produced by a little animal called the *glow worm of the sea*.[g] This animal has a body extremely thin and transparent, is possessed of astonishing activity, and emits a dazzling and vivid light. The observations of Griselini, of Godeheu, of Dagelet, and of Adanson,[h] have proved that the sea contains other luminous animals, particularly scolopendræ, and polypi. The *medusas* dart from their antennæ, or horns, a very strong light, similar to that of a candle, whilst their body remains in obscurity.[i] The *pennatula marina* throws out so much light, that it makes all the other fish caught in the same net quite discernible at night.[k] All the Zoophytes and the Mollusca seem to be phosphorescent in a greater or less degree. The observations of Péron,[l] and Langsdorff,[m] confirm this explanation of the luminous phenomena in the sea, and it is the only one that can be admitted as general. It appears that this emission of phosphorus arises from the excited state of the vital spirits in these different animals, and that it is chiefly at the moment of amorous enjoyment that they cast forth so brilliant a light.

Fougeroux, Canton, Forster, and other accurate observers, while they agree with respect to the existence of glow worms, think that the light of the sea, when it is tranquil, and as it were united with the water, originates from the decomposition of vegetable and animal substances, collected together in it, and which, in putrifying, emit their phosphorus. Light of this description is chiefly observed in long calms, and after great heat.[n] The spawn of fish also possesses the power of emitting a certain light—it is perhaps to this cause that we owe those luminous appearances in the Northern seas, which are called by the fishermen herring lights. This marine phosphoric light has been noticed to be strongest during a storm, which has given rise to the belief that the phenomenon was produced by the friction of the marine currents.[o] Upon this subject we shall quote a reflection of Newton's: "Do not all solids," says this great philosopher, "when they are heated beyond a certain degree, emit a portion of light—and is not this emission produced by the vibratory motion of their particles? And do not all the bodies which abound in earthy, and particularly sulphureous particles, throw forth light as often as these particles are sufficiently agitated, whether this agitation proceed from heat, friction, putrefaction, from vital motion, or from any other cause? It is thus that sea water in a strong tempest becomes luminous."[p]

[a] See, among others, Forster's Observations made during his Voyages, p. 50—52, (in German.) Brehmar, Nouvelle Méthode de Distiller l'Eau de mer, dans Voigt, Magasin des Sciences Naturelles, vii. 417, *sqq.*

[b] "*Parage.*"

[c] Sedge Sea—sea abounding in sea-weed or fuci.—P.

[d] "*Floraison des lacs.*"

[e] Confervas?—P.

[f] Rigaud, Journal des Savans, 1770, Cahier de Mai. Dicquemare, Journal de Physique, Octobre, 1775. Viancelli, Nuove Scoperti alle Luci Nocturne. Venice, 1746.

[g] "*Ver luisant de mer.*"

[h] Lalande, Lettre, &c. dans le Journal des Savans, 1777. Griselini, Observations sur la Scolopendre Marine, &c. Journal de Physique, 1784, Janvier &c

[i] Forskal, dans Niebuhr, Voyage en Arabie, i. p. 7, (in German.)

[k] Philosophical Transactions, vol. liii. plate 19, fig. 1—4. Shaw, Spallanzani, &c.

[l] Péron, Voyages aux Terres Australes, i. 41. Comp. Annales du Muséum, ii. cahier 2.

[m] Langsdorff, dans Voigt, Magasin de Physique et d'Histoire Naturelle, x. 202.

[n] Forster, Observations, etc. p. 57—58. Id. dans Sparrmann, Voyage au Cap, p. 5. Canton. Philosoph. Transact. vol. lix. p. 446. Fougeroux, sur la lumière que donne l'eau, etc. Mémoires de l'Acad. de Paris, 1767.

[o] Bajon, Histoire Naturelle de Cayenne, vol. i.

[p] Newton's Optics, p. 314.

The light which arises from living animalcules generally precedes storms, the approach of which they in some way appear to foresee.

The temperature of the sea changes less suddenly and less easily than that of the atmosphere. Sea water is a bad conductor of heat. Besides, the visible solar rays cannot heat the bottom of the sea, as they only penetrate to 270, or, according to Bouguer, 678 (French) feet. Beyond that limit the sea receives no more light —but the heat perhaps penetrates a little farther. The temperature of the bottom of the sea would appear then to follow that of the interior of the globe in different latitudes. But the experiments of M. Péron have proved, that the temperature of the sea at great depths diminishes in a constant progression, from which fact, however, we must not conclude that the bottom of the sea is actually congealed.[a]

Marine ice appears to be produced towards the poles, according as the saltness of the sea diminishes, and the rotatory motion of each point of the globe becomes less rapid. As low as the 40th degree of latitude, large pieces of ice are seen floating upon the sea, having been detached from some more northern place, and carried along by the currents which flow from the pole to the equator. At 50 degrees, it is common to see the rivers, the lakes, and even the edges of the sea covered over with ice. At 60 degrees of northern latitude, the gulfs and the interior seas are often frozen over their whole surface; at 70 degrees, the floating fields of ice become more frequent and more enormous; and towards the 80th degree, we generally find the ice stationary; not because the sea is frozen down to its bottom, but because the ice then sticks together, and becomes immoveable from the vastness of the masses in which it is accumulated. All these phenomena are met with in the southern hemisphere, but in a more rapid progression, so that fields of ice occur at 70 degrees, and extensive floating islands of ice appear in great numbers, and are sometimes even stationary on this side of the 60th degree of latitude.

The islands of ice are often half a league long, and rise 100 feet above the water. These enormous masses, so dangerous to ships, are formed, it is said, by the accumulation of sheets of ice which glide the one over the other; but I should be inclined to believe, that in many cases the masses of ice are like crystals formed simultaneously, and as it were at one cast. Congelation is in truth nothing but crystallization, and the principle which determines it may, towards the poles, be exerted with a force beyond our conceptions.

The fields of ice are frequently of immense extent. Cook found a chain of them which joined Eastern Asia to North America. The appearance of these continents and islands of ice surpasses all that the imagination can conceive. Here, we fancy that we behold mountains of pure crystal and valleys sown with diamonds. There, grayish towers with their resplendent points seem to rise above battlements of glass. The magnifying medium of a hazy atmosphere, renders this spectacle still more gigantic. He must have a heart of iron who dare penetrate into these inhospitable seas; for, if the navigator has not to fear tempests, which are extremely rare in these latitudes, nor water spouts and hurricanes, which are there unknown, he will be assailed with other dangers much more capable of appalling the most intrepid minds. Sometimes huge bodies of ice, impelled along by the winds and the currents of the sea, dash against his frail vessel; and there is no rock so dangerous nor so difficult to avoid. Sometimes these floating mountains treacherously surround the navigator, and block up every outlet; his ship is arrested in her course, and becomes immoveable. In vain does the feeble axe endeavour to break these enormous masses, in vain do the sails invite the winds; the ship is as it were soldered into the ice, and the mariner, cut off from the world of living beings, remains fixed in a solitude of death. How frightful is the situation of those who, thus hemmed in by the ice, have no other resource left than to quit their vessel and walk over that consolidated crust of sea, which is every moment cracking and ready to sink under their feet! When almost dead with cold and hunger, they consider themselves fortunate should the floating piece of ice on which they sail cast them on the shore of Siberia, or Nova Zembla. But there is generally very little hope of life for the wretched beings who suffer shipwreck in these dreadful regions. Either the icy waves ingulph them, or they are devoured by the tyrant of this dreadful empire, the white bear; or, lastly, the intensity of the cold extinguishes the vital heat, their feet adhere to the ice, their blood no longer circulates in their veins, and the polar night becomes to them a night which is eternal.

An ingenious writer[b] has imagined, that the poles were each of them surrounded by a vast cupola of ice, so extensive as to produce by its daily melting, the phenomenon of tides, just as the melting of the snow in the Alps occasions periodical movements in certain lakes and fountains; but the phenomena of the tides cannot be explained in this manner, and even the existence of two similar cupolas is very doubtful. As a certain agitation is necessary to produce ice, it may be supposed that congelation is of a more permanent character towards the 80th degree than at the pole itself.[c] Some sudden squalls of wind, which navigators experience in these latitudes, and which come from the pole, appear to indicate successive changes in the state of this extreme point of the globe. It is more certain, that the melting of the polar ice contributes to form the currents which set from the pole to the equator.

The masses of ice do not diffuse so piercing a cold around them in the regions where they are found, as, when detached and melting, they are carried by the waves towards other parts of the ocean; for, as ice is formed only in consequence of the absence of heat or caloric, its melting is occasioned by a new combination with caloric; which it absorbs with avidity from the

[a] Péron, Mémoire lu à l'Institut.

[b] Bernardin de Saint-Pierre, Etudes de la Nature.

[c] The late discovery, by Capt. Weddel, of a perfectly open sea, in 74° 15′ S. lat. (see note p. 60,) while the sea was almost completely blocked up with ice at 69°, and very much encumbered at 64° and 65°, in the lat. of New South Shetland, is a strong argument to prove, that ice is generally formed in the polar seas, around the land or in shallow waters, while it is not permanently formed or accumulated in the deep open seas, perhaps even under the pole itself.—P.

surrounding air, and consequently renders it extremely cold.

The water of the sea yields to the slightest impression —and although its density and weight combine to retain it in a constant equilibrium, it is agitated to a certain depth, by very rapid and varied motions. These motions may be classed according to the manner in which the particles move, and according to the nature of the agents which give rise to the motion.

Difference of direction distinguishes the *horizontal* motions from the *vertical*. In the first, the water flows along the surface of the globe; in the others, it retires from, and approaches to the centre of the earth. Horizontal motions may be *direct* or *recurved*, or even *circular*, &c. On the extent and duration of the motion depends the difference between *oscillations*, in which the whole mass of water is moved at once, and *undulations*, in which the motion is propagated from one part of the mass to the other.

We may distinguish three kinds of motions in the sea, considered in reference to the causes which produce them; the tides are *sidereal motions*, because they depend upon the influence of the heavenly bodies; general currents, and the greatest number of particular currents, have their causes in the very element that is agitated by them; these then are *motions of the sea itself*. The third kind comprehends *atmospherical motions*, produced by the action of the winds. As to those violent oscillations which accompany earthquakes, and thus evince the ocean to be connected with volcanos, I should wish to call them *seaquakes*;[a] they deviate much from the series of ordinary motions.

We may distinguish in the sea three regions or beds, one above the other, but without any constant limit; the first, agitated by the winds, is the *region of undulations*—this is immediately followed by the *region of currents*; and lastly comes the *immoveable region*, where the density of the particles from pressure, from their adherence to the globe and from friction, prevents all motion.

The motions of the air produce corresponding motions on the surface of the water. Unequal and violent winds give rise to *waves* which tower aloft like foaming mountains, roll, rebound, and dash against each other: one moment they seem to bear on their surface the goddesses of the sea who come to sport in the dance; the next they are involved in the fury of the tempest, they appear to swell with rage, and present to the imagination the monsters of the deep contending in wrath. A strong, constant, and equal wind, produces long ridgy *waves*,[b] which all rise as it were with the same front, push forward with uniform velocity, and precipitate themselves in regular succession on the shore. Sometimes these waves, suspended by a gust of wind, or arrested by a current, form a kind of liquid wall, to the imminent danger of the navigator.

All these oscillations arise from a current of air, which, by dislodging a certain portion of the waters, has destroyed the equilibrium which every moment they endeavour to recover. These motions are similar to those of a pendulum; they affect only the surface of the waters. The divers assure us, that in the greatest tempest, calm water is found at the depth of 90 feet. Geometricians have attempted to subject these motions to calculation. "The rapidity of the propagation of waves," says an eminent philosopher,[c] "will be the same as that which a heavy body would acquire in descending from an height equal to the half of the depth of water in the channel. Consequently, if this depth is one foot, the velocity of the waves will be $5\frac{5}{10}\frac{1}{00}$ feet in a second and if the depth is greater or less, the velocity of the waves will vary in the subduplicate ratio of the depths, provided that they are not too considerable."

We must distinguish the *waves* produced by the immediate action of the wind, from those which arise from the impulse communicated by a preceding wind, or by a current, or by any other cause. Navigators often experience this double oscillation, which contributes to augment the agitation of the vessel.

The tides are regular and periodical oscillations, which the seas of the terrestrial globe undergo from the attractions of the celestial bodies, principally those of the moon and sun.[d]

Let us first consider the single action of the moon upon the sea; suppose then that luminary in the plane of the equator. It is evident, that if the moon exerted upon all the particles of the sea an equal attraction, and parallel to the earth's centre of gravity, the entire system of the terrestrial spheroid, and of the waters which cover it, would be influenced by a common motion, and their relative equilibrium would not suffer any change. This equilibrium is disturbed only by the difference between the attractions which the moon exerts, and the inequality of their directions. Some parts of the globe are directly attracted by the moon, others only obliquely The former are in conjunction with the moon; and a line drawn through the centres of the two planets would pass through their zenith. The latter are in quadrature with the moon, that is to say, a line drawn from the terrestrial centre to their zenith, would make an angle of 90 degrees with the line which joins the centres of the two planets. The attractive force acting obliquely is decomposed, on account of the obliquity of its angle of incidence; thus the parts in conjunction being more strongly attracted than those in quadrature, the weight of their particles is diminished. It is necessary then, to there being an equilibrium in all parts of the sea, that the waters should rise under the moon, in order that the excess of weight of the particles in quadrature, above those in conjunction, may be compensated by the greater height of the latter.

The waters, however, rise not only on the side where the attracting planet is, but also on the opposite side, because if the planet attracts the superior waters more than it attracts the centre of the earth, it also attracts this centre more than it attracts the inferior waters in the opposite hemisphere. These waters then will approach less towards the attracting planet, than the cen-

[a] "*Tremblemens de mer.*"
[b] "*Lames.*"
[c] Lagrange, Mécanique Analytique, p. 491.
[d] Bernouilli, Mémoire couronné sur le flux et le reflux. Memoirs of Euler and Maclaurin, the latter under the title of Theory of Flux and Reflux, 1740. Lalande, Traité sur le Flux et Reflux, 1781. Laplace, Système du Monde. Idem, dans les Mémoires de l'Académie des Sciences, 1790.

tre of the earth approaches to it. They will remain as far off from and behind the centre, as the superior waters advance from it on the side of the moon.

Two promontories, or eminences of water, will therefore be formed by the action of the moon upon the earth —one on the side towards the moon, the other on the side opposite to it, which will give the sea an appearance of an elongated spheroid, whose great axis will pass through the centre of the moon and of the earth. It is *high* tide under the moon, and in the opposite point at 180 degrees of distance; consequently, in the two intermediate points, or at 90 degrees distance from the moon, the tide will be *low*.

The earth, by its rotatory motion, successively presents to the moon, in the space of 24 hours, all its meridians, which, consequently, are found by turns, and at an interval of six hours, sometimes under the moon, and sometimes at a distance of 90 degrees from it: Hence it follows, that during the time which passes between the departure of the moon from one meridian, and its return to the same meridian, that is, in the space of a lunar day, which exceeds the solar day by about 50 minutes and a half, the waters of the sea will ebb twice, and flow twice in every part of the earth, although in a manner almost insensible in those places which are distant from the path or orbit of the moon.[a]

The earth, in revolving upon its axis, carries along with it, to the eastward of the moon, the promontories, or the most elevated particles of water; these will still continue to rise by the action of the moon; and although that action, already less direct, is diminishing in force every moment, yet it subsists, and continues to combat with the inertia and friction which retard the elevation. It is for this reason, that the elevation does not attain its *maximum* at the very moment of the moon's passing the meridian, but about three hours after.

A second cause tends to produce the same effect. The waters placed in quadrature, on the west of the moon, and carried towards conjunction with that planet, by the rotatory motion of the earth, will be continually accelerated during the quarter of the day, when they are in this position, and will move after the syzygy or conjunction, with the sum of these accelerations, and then meeting with particles continually more retarded than the earth, they will form two contrary currents, which will place the greatest elevation at about 45 degrees past the syzygy. For the like reason, the greatest depression of the water will not happen at the quadrature, but three hours after, and at 45 degrees from that point.

If we now imagine the sun to be in the plane of the equator, it is evident that, as its action is similar to that of the moon, it should excite in the ocean an agitation similar to the lunar tides. Thus the sea would ebb twice and flow twice during a solar day; but, on account of the immense distance of the sun, these solar tides will be much smaller than those which result from the action of the moon. According to Lalande, the influence of the moon is $2\frac{7}{10}$ times greater than that of the sun; Laplace considers it even triple.

On account of the inequality which exists between the solar and lunar days, the action of the sun will sometimes counteract the lunar tides, and at other times will unite its influence with that of the moon. In the syzygies or conjunctions, the action of the moon concurs with that of the sun to raise the waters. This is the reason why the highest tides happen at new and full moon; or when the moon is in its first and third quarters. In the quadratures, the waters of the sea are depressed by the action of the sun, at the same point where the action of the moon raises them, and reciprocally. Thus the tides of the quadratures ought to be less. But the highest tide does not, and should not happen precisely on the day of the new and full moon, but two or three days after. The reason of this is, that motion once acquired, is not all at once destroyed; it continues to augment the elevation of the waters, although the immediate action of the sun is in reality diminished.

What we have already mentioned regards the position of the sun and moon in the equator. Let us now consider these heavenly bodies in their various declinations, and we shall see the elevation vary in the inverse ratio of the cube of their distance from the water.

Without entering into details, which would require mathematical demonstrations, we will only remark, that the proximity of the sun and moon seems to be the cause to which we must refer the extraordinary equinoctial tides, which happen most frequently, the one before the *vernal equinox*, and the other, *after the autumnal*, that is, both of them at the time when the sun, passing through the meridional signs, is nearest us. But this does not happen every year, because there are sometimes variations produced by the situation of the orbit of the moon, and by the distance of the syzygies from the equinoxes.

The great inequalities in the depth of the sea, the situation of the coasts, their declivity under water, sometimes rapid, sometimes otherwise; the different breadth of the channels and straits; and, lastly, the winds and currents; all these local, and sometimes accidental circumstances, alter the progress of the tides,—make them deviate from that regularity which they would have maintained in an open sea,—augment the impetus of the flow upon the coasts of confined channels, and by causing the degree of friction to which the waters are exposed to vary, shorten or prolong the relative duration of high and low water. Thus we see in the islands of the South Sea, regular tides of only one or two feet elevation,[b] whilst upon the western coasts of Europe, and upon the eastern coasts of Asia, the tides are extremely strong, and subject to many variations. It is affirmed, that the island of Formosa, near China, experienced, in 1632, a tide which passed above the chain of mountains which traverses the island; but it is rather difficult to give full credit to this phenomenon.[c] Upon the coasts of France, which border the British Channel, the flux being confined in a basin, and at the same time repelled by the coasts of England, rises to an enormous height; at St. Maloes, even to 50 feet.

In the gulf of Hamburgh, the tide is sometimes the result of three combined forces, namely, one flux coming from the straits of Calais, another flux coming from the Orkney islands, and turned towards the German

[a] "*La route lunaire.*"

[b] Forster, Observations during a Voyage round the World.

[c] It is indeed singular that such a statement should have been seriously introduced into this geography.—P.

ocean by the polar current, or by the very strong north-west winds; lastly, (as I believe) the repulsion of the waters of the Elbe and other rivers. The ordinary tide at Hamburgh rises 6 feet 8 inches. The tide of the syzygies, that is, of the new and full moon, is 7 feet 3 inches. But when the wind blows with violence from the north-west, the tide rises to 18 feet, sometimes even to more than 20 feet. Hamburgh is 30 leagues from the mouth of the Elbe, and the tide makes these 30 leagues in 5 hours 23 minutes; when it arrives at the mouth of the river, it takes from three quarters of an hour to one hour and a quarter to force back or overcome the river current. The same current makes the flood-tide at Hamburgh last only 4 hours 18 minutes; and the reflux or ebb-tide 8 hours 6 minutes. This example may serve to explain all the phenomena of the tide, when confined in a narrow channel, and acted upon by a current contrary to its direction.

In the torrid zone, the flood-tides run from east to west with the motion of the stars. In the northern temperate zone, they come from the south; and in the southern zone, from the north: that is, both of the temperate zones are affected by the influence which the heavenly bodies have upon the torrid zone; the waters of which are more directly under their agency. To this theory there are exceptions, but they are entirely local. The northern frozen zone has very small tides; its distance from the equator, the land which surrounds it, as well as the ice with which its seas are encumbered, all combine to destroy the effect of a sidereal attraction. We know nothing of the southern frozen zone.

If it be objected to this theory of lunar attraction, that there are gulfs as well as inland seas in which there are no tides, we may answer, that these phenomena are fresh proofs in favour of the hypothesis against which they are brought. In small collections of water, the moon acts at the same time upon every part; it diminishes the gravity of the whole mass. But there is little or no surrounding water which can come and accumulate with the body thus attracted and elevated; for this swelling owes its origin less to a vertical or perpendicular motion of the attracted waters, than to the lateral flowing in of the neighbouring waters, in consequence of their superior gravity. This is the reason why the Mediterranean has only very small tides, which seem to be formed chiefly in the part extending to the east of the island of Malta, and to proceed northwards into the gulf of Venice.

The ocean communicates the effect of its tides to the gulfs and inland seas which have their entrances turned towards the cardinal points whence the tide comes. The Baltic and Mediterranean are not in this situation. But Hudson's and Baffin's Bays are, and there the tides are sensibly felt. The gulf of Arabia is also a striking example.

Let us now proceed to the consideration of the *motions of the ocean itself*, that is, of general and particular *currents*. It is remarked, particularly between the tropics, and as far as 30 degrees of north and south latitude, that there is a continual motion in the waters of the ocean, which carries them from east to west in a direction similar to that of the *trade winds*, but contrary to that of the rotation of the globe.[a] Navigators, in order to go from Europe to America, are obliged to descend to the latitude of the Canary islands, in order to catch the current, which carries them with rapidity to the west. They observe the same rule in going from America to Asia by the Pacific Ocean. We might imagine that they do this on account of the trade winds; but they assure us, that the action of the atmospheric current is very easily distinguished from that of the marine current. Of this they are convinced, because the vessel makes more way than it could do with the assistance of the wind alone. This fact is likewise proved by the direction in which bodies are observed floating on the surface of the waters; and in many of the straits, these currents are at times productive of effects extremely violent.

A second motion impels the sea from the poles towards the equator. It has also its corresponding motion in the atmosphere. The most decisive evidence of this motion, is deduced from the direction of the floating pieces of ice, which invariably proceed from the poles towards the equator.

The origin of these two motions appears to depend upon the sun, and the rotation of the globe. The motion which carries the polar waters towards the equator, (and which I shall designate by the names of *northern and southern polar currents*,) is explained in the following manner: Every day the solar rays dissolve an enormous quantity of ice; thus the polar seas have always a superabundance of water, which they endeavour to discharge. As the water under the equator has a less specific gravity, and as, moreover, the evaporation, which is very powerful under the torrid zone, absorbs a great part of it, it is necessary that the neighbouring waters should flow towards the equator in order to re-establish the equilibrium. This motion is propagated from one aquatic region to another; and thus, every moment, the circumpolar waters are impelled towards the equator.

The motion from east to west, (which may be called a *tropical* or *equatorial current*,) appears to be the result of more complicated combinations. The trade winds, far from being the only cause of the general motion of the sea, may perhaps be rather the effect of it, at least in part. The sun and the moon in advancing every day to the west, relatively to a fixed point taken upon the earth, ought, according to Buffon, to draw the mass of waters on towards the west. This circumstance retards the daily tides, so that the flood-tide may be considered as a swelling of the sea, which makes the tour of the globe in 24 hours, 49 minutes, in retreating each day towards the west; whence, it may be concluded, that there ought to be an habitual tendency of the waters towards the west. This explanation is not sufficient for these phenomena: the following appears to us the most plausible.

The action of the sun, and the terrestrial rotation

[a] Kircher, Mund. Subterran. tom. i. lib. 3. sect. 1. Riccioli, Geographia Reformata, x. 3. §§. Fournier, Hydrographie, lib. ix. c. 22. Varenius, Géogr. Générale, ch. xiv. prop. 7, *sqq.* Pownal, Hydraulic and Nautical Observations in the Atlantic Ocean, London, 1787. Franklin, Maritime Observations, in the Transactions of the American Society of Philadelphia, vol. ii. p. 315, *sqq.* Fleurieu, dans le Voyage de Marchand. Dampier, Forster, &c.

constantly diminish the gravity of the equatorial waters, and evaporation draws off a quantity infinitely greater than the rivers can supply. The waters of the seas more distant from the equator, are therefore impelled to fill up this vacant space; and thence arise the two polar currents. Now these waters, which come from the colder zones, (particularly in the great ocean, where the transition from one climate to another is more rapid,) these waters, I observe, have a considerably greater weight than those which they come to replace. But the most essential circumstance is, that they possess a rotatory motion infinitely slower than the waters in the torrid zone; but these polar waters, from the force of inertia, do not at once lose the degree of motion which they first acquired. They cannot then follow the rotation of the globe; heavy and motionless in themselves, they have suddenly fallen into the sphere of the most rapid mobility; and preserve for some moments their primitive character. But the solid part of the globe moving with velocity to the east, leaves the waters always a little behind. Hence they *seem* to move towards the west with a rapidity proportioned to the superior velocity with which the solid parts of the earth really move towards the east; and thus the waters not readily conforming to the rotatory motion of the earth, retire from the western coasts of the continent, or rather the eastern coasts advance upon them.

Hence it appears that this great and wonderful motion is only a vast and calm oscillation, depending solely upon the equilibrium of the ocean. But when so powerful an oscillation meets with narrow straits, with obstacles which impede and divert, without stopping its regular course, it then changes into a current, which is violent and often very dangerous.

Let us now endeavour to explain, upon rational principles, the various modifications which the motion, *peculiar to the sea itself*, undergoes.

The Pacific Ocean, by its general motion, retreats from the coasts of America, and flows from east to west; and this motion is very powerful in the vast and uninterrupted extent of that sea. Near Cape Corrientes, in Peru, the sea appears to flow from the land, by this single cause. Ships are carried with rapidity from the port of Acapulco in Mexico, to the Philippine Islands.[a] But in order to return, they are obliged to go to the north of the tropics, to seek the polar current, and the variable winds. On the other side, the south polar current finding no land to impede it, carries along with it the polar ice even to latitudes where the motion of the tropical current begins to be felt. This is the reason why, in the southern hemisphere, floating pieces of ice are met with at 50, and even at 40 degrees.

The Pacific Ocean, in its motion towards the west, is impeded by an immense archipelago of flats, islands, submarine mountains, and even lands of considerable extent; it penetrates into this labyrinth, and there forms one current after another. The direction which the principal of these currents observe, is conformable to the general motion towards the west. But, as might be expected, the inequalities of the basin of the sea, the coasts, and the chains of submarine mountains, sometimes turn these currents towards the north or south. We may easily conceive, that a strong repercussion of the waters of the ocean, in consequence of their meeting with a large mass of land, (as New South Wales,) may even produce a counter current, which will return towards the east, and which, by breaking, will also produce other currents differently directed. Here then is the origin of those currents, so adverse and dangerous, which Cook and La Perouse mention in their voyages.

The principal current, setting towards the west, still acts with force in the recently discovered strait, which separates New Holland from Van Diemen's Land; this is the current which carried Captain Flinders into the strait, and which hindered so many earlier navigators from entering it, because they approached it in a direction contrary to that of the sea.[b] The same current flows through the channel which separates New Holland from New Guinea; but here, from the innumerable inequalities which it meets with, it is subdivided into several currents, of varied and inconstant direction.

Let us now enter upon the consideration of the Indian Seas. There we shall find the celebrated perpetual current, which runs along New Holland, and the Island of Sumatra, always to the north, as far as the bottom of the Bay of Bengal. This current arises from the pressure of the polar currents upon the large opening which the Indian Sea presents to the south. That sea is bordered towards the north by a continent; the equatorial current, which is formed there, is therefore only feeble, or altogether ceases, as there is no mass of cold water passing from the north. On the other side, the Pacific Ocean cannot carry its impetus thither; it is broken and dispersed in the labyrinth of islands. Thus the influence of the southern polar streams predominates without a rival, and without an obstacle in the Indian Sea; and these produce that perpetual current which sets towards the Bay of Bengal, upon a line more and more inclined towards the north-west, or following the conformation of the coasts.[c]

The action of the general motion of the ocean, at first weak in the Indian Sea, as we have already mentioned, augments by degrees, till it gains the ascendancy. It is easy to conceive that a general impulse which acts in a vast fluid, and which influences all its particles, ought to increase according as that fluid extends in the direction of the moving power. One part of the sea then reacts upon the other, and the sum of these repeated effects becomes in time immense. These principles show why, towards the Island of Java, the natural motion of the sea is changed by the northern current,[d] of which we have already spoken, and why this same motion towards the west is found in the neighbourhood of Ceylon, and the Maldive Islands. But a new local circumstance again makes this motion decline from its natural direction. A chain of islands and shallows extends from Cape Comorin, in the peninsula of India, to the northern point of Madagascar. The principal current being in-

[a] See, in the course of this work, Description of South America, New Holland, New Guinea, and the Philippine Islands, &c.

[b] Flinders, Observations during his Voyage to Bass Strait, London, 1811. Compare the Voyage of Entrecasteaux, i. 230.

[c] Varenius, Géog. Générale, ch. xiv. prop. 24. Voyages de Gentil, de Macartney, de Marchand, &c.

[d] We say a Northern Current, or a Southern Current, to designate a current with such a direction.

terrupted by these obstacles, turns towards the south-west; and, in maintaining that direction, glides along that chain of mountains, some of them submarine, others rising into islands. Having passed Madagascar, it turns towards Africa, dashes against that continent, and sweeps with great violence the coasts of Natal (*Terre Natal.*) At the point where the coast of Africa, turning towards the west, ceases to present an obstacle to the progress of the water, the current loses all its impetuosity, and mingles in the general motion of the Ethiopian Ocean.[a]

We have said, that towards the Maldive islands, the principal current, or great mass of water, turns to the south-west; but the more superficial, and consequently the more variable currents, continue their course from the east to the west, that is, towards the Gulf of Arabia, and the coasts of Zanguebar. These are the currents which, setting towards the south-west, render the Mozambique channel so difficult to navigate, and which have given the name it bears to Cape *Corrientes*, upon the coast of Inhambane. They reunite at this Cape with the perpetual current.

Let us remark here, that in general the currents which do not extend to a great depth under the level of the waters, are liable to change with the winds, particularly when they blow for a long time with an equal and constant force, as the *Monsoons* do. These are the winds which give by turns entirely opposite directions to the currents which prevail from the Maldive Islands to Arabia and Zanguebar. The shallows and rocks with which these parts are strewed, equally contribute to produce the same effect.

The northern current which runs along New Holland, and the Island of Sumatra, impels one of its branches through the strait of Sunda. This current, according to some authors, is the same that predominates in the Chinese Seas, and which La Perouse found to be of such strength in the sea of Japan, and in the channel of Tartary.[b] But after comparing together the accounts of different navigators, it appears to us that these currents not only vary with the Monsoons, but that no connexion subsists between them. All the southern and northern currents that we observe along the eastern coasts of the continents, are only necessary continuations of the general motion of the ocean towards the west; the waters, impelled by this motion towards the eastern coasts of the two continents, and finding no outlet, must with much force, flow back along the coasts in a southern or northern direction, as local circumstances determine them. In Behring's Straits, the polar current, which brings the ice from the polar seas to the environs of Kamtchatka, is distinctly felt.

Let us go on to the currents of the Western Ocean. The form of the basin, whose length is much greater than its breadth, is what in a great measure determines these currents. The first current which presents itself to our notice, is that which carries forward the waters of the Ethiopian Ocean, along the coasts of Brazil, and through the Strait of Magellan, into the Pacific Ocean. This course is conformable to the general progress of the ocean. It would appear from the voyages of Marchand and Ingraham, that between Terra del Fuego, New South Georgia, and Sandwich Land, (or the *Thule Australis* of Cook,) there are several opposite currents, but our knowledge of them is far from being accurate.

The most celebrated perpetual current of the Atlantic Ocean is that which commences on this side of Cape St. Augustin, in Brazil, and extends towards the eastern coasts of America. It is extremely rapid, and is felt in all the extent of sea over which the Antilles are scattered. This current is only the result of the general motion of the Atlantic Ocean towards the west; it prevails between the 30th degree of northern, and the 10th of southern latitude, and begins at 20 or 30 leagues from the coasts of Africa. This is the reason why European vessels, in order to profit by this current, and the trade winds, proceed to the Canary Islands before they attempt to traverse the ocean.

Upon the coasts of Africa, within the limits pointed out above, there exists a current directly contrary to the preceding; which is neither less rapid nor less steady. Ships, if they approach too near these coasts, are drawn into the Gulf of Guinea, and with great difficulty get out of it. No adequate cause can be assigned for this singular current. Some authors imagine, that there are two currents in the Atlantic ocean, one at the surface, the other at the bottom; and that it is this latter which brings the waters towards Africa; but such an explanation is inadmissible, from the well known fact of the *general* motion of the sea, which is not superficial, but which pervades the whole of the mass. It is more probable that the current in question comes from the Straits of Gibraltar, along the coasts of Africa, where the waters have not acquired all the velocity of the general motion; but we can affirm nothing with certainty on the subject.[c]

A third very celebrated current is that by which the waters of the Atlantic are carried violently into the Gulf of Mexico, and, discharging themselves through the *channel of Bahama*, run with inconceivable rapidity towards the north, or rather the north-east. It follows the coasts of the United States, widens continually, and at the same time grows weaker, and extends, according to some navigators, as far as the coasts of Scotland and Norway. It is easily known by the beautiful blue colour of its waters.

The polar currents of the north exhibit very remarkable effects; it is they which bring upon the coasts of Iceland such an enormous quantity of ice, that all the northern gulfs of that country are filled with it to the very bottom, though they are often 500 feet in depth. The ice is sometimes raised up so as to form mountains. Some years no ice, but immense collections of floating wood, particularly pines and firs, are cast ashore. It is in the semicircular hollow of the northern coast of Iceland that the wood and ice are accumulated. It is evident, that it is one and the same cause which brings them thither; and as it is impossible that great trees can be

[a] Varenius, Geographie Générale, ch. xiv. prop. 25.

[b] Voyage de la Pérouse. See the articles Japan, Corea, Yeso, &c.

[c] Humboldt supposes that there is a current setting from the N. W. towards the coast of Africa, by the Azores and Madeira, and then sweeping along the African coast, until it falls in with the limits of the trade winds, where it is converted, at least in part, into the great equatorial current. He supposes it to be a reflection of the gulf-stream, from the banks of Newfoundland, which by the common law of incidence, would take this direction towards the coast of Africa.—P.

produced under the pole itself, the wood can come only from Siberia or North America.

The phenomenon of these floating forests, which are only found in the circumpolar seas of the north, has very much engaged the attention of geographers, and it is not yet perfectly explained. It is believed, that the wood is drifted partly from the Gulf of Mexico, by the current of Bahama, because specimens of timber have been occasionally seen, which grow only in Mexico and Brazil. These kinds however are in small quantities. Siberia and the unknown northern coast of America, contribute probably much greater portions.[a]

It is very probable, that there may be in the same place a double local current, the one above, near the surface of the water, the other at the bottom. Several facts seem to prove this hypothesis, which was first proposed by the celebrated Halley. In the sea round the Antilles, there are some places where a vessel may moor itself in the midst of a current, by dropping to a certain known depth, a cable to which is attached a sounding lead. At that depth, there must unquestionably be a current contrary to that which is at the surface of the water; the stationary and quiet situation of the vessel arises from the equality of the two forces which act, the one upon the ship, and the other upon the cable with the sounding lead.[b] Similar circumstances have been observed in the Sound. There is reason to believe that the Mediterranean discharges its waters by an inferior or concealed current. A difference of density in the strata of water, a great rapidity of motion, and the coherence of fluid particles, are plausible reasons in favour of this hypothesis of double currents.

It is more easy to prove and explain the existence of opposite currents which pass along by the side of each other. In the Kattegat, a northern current proceeds from the Baltic along the coasts of Sweden, and another, a southern current, enters into the Baltic along the coasts of Jutland. In the North Sea there is a north current, which comes from the Pas-de-Calais,[c] or that part which separates the English channel from the North Sea, and a south current which goes from the Orkneys along the British coast. The great rivers, while discharging themselves, occasion currents at their mouth often contrary to those of the sea. It would be superfluous to produce any examples of this.

When two currents of a more or less contrary direction, and of equal force, meet in a narrow passage, they both turn in a curve, which is sometimes spiral, until they unite, or one of the two escapes. This is what is termed a *whirlpool* or *eddy*. The most celebrated are, the *Euripus*, near the island of Eubœa, *Charybdis*, in the straits of Sicily, and the *Malstræm*, in the north of Norway. These eddies sometimes augment their force by means of two contrary high tides, or by the action of the winds; they draw vessels along, and dash them against the rocks, or ingulph them in the eddies, the wrecks not appearing till some time afterwards. Upon this simple ground, very marvellous fables have been invented, and mention has been made of gulfs at the bottom of the sea, and subterraneous rivers, and other things, the existence of which is quite imaginary.

The depth of currents is a physical problem very difficult to solve. The perpetual currents, however, from their regularity, and from their extremely strong action, even in the greatest calm, sufficiently indicate that they have a considerable depth. Their rapidity is no better known. It is independent of winds and undulations. But how can we distinguish it from these two forces, which, acting on the surface, are more sensibly felt by navigators? There are many other questions impossible to solve that might be proposed on the subject of the ocean,—the cradle of the universe, and perhaps its grave.

Note.—The facts recently brought to light respecting the action of the ship itself on the compass, afford reason to believe that some of the currents mentioned by navigators are imaginary. The existence of these currents has been inferred in many cases from the difference between the true course of a ship as ascertained by observation, and her apparent course as shown by the compass. This difference, however is explained in a satisfactory manner by the deflection of the needle from the magnetic north, by the action of the mass of the ship upon it; in consequence of which a ship's apparent course is often found to differ from her true, by one or even two points. The errors in reckoning which this produced, as mariners were long ignorant of their cause, were often ascribed to currents. See *Bain on the Variation of the Compass*, Edinburgh, 1817.

[a] See, for a more detailed opinion, the article Iceland, of this work.

[b] Observations of Dr. Stubbs, in the Philosophical Transactions, No. 27.

[c] Straits of Dover.

BOOK XV.

Continuation of the Theory of Geography. Of the fluid which surrounds the Globe, or the Atmosphere. Of Meteors.

HAVING gratified our curiosity with contemplating the wonders of the earth, we proceed to the consideration of the vast assemblage of fluids with which it is surrounded, and which may be said to constitute an integral part of the globe itself. This celestial ocean, which is called the atmosphere, that is to say, the sphere of vapours, forms the subject of our present researches.

The atmosphere is the grand laboratory of nature, in which the various gases exhaled from our globe are collected together, and distilled, mixed, decomposed, volatilised, condensed, or precipitated in an endless round, according to laws which chemists often in vain attempt to discover. All terrestrial beings pay tribute to the atmosphere; all receive from it the principles necessary for life and vegetation, and probably even inorganic existence is dependent upon it. There is perhaps no substance which is not reducible to the aeriform state by heat, and which cannot be rendered a solid by cold. Were this planet transported into the temperature which Mercury possesses, a part of our sea and of our land would evaporate, and mingle with the atmosphere; and, on the other hand, should our globe at any time wander towards the cold regions of Saturn or Uranus,[a] a great portion of our atmosphere would be condensed and pass to the solid form. Our atmosphere therefore may be thus defined: "The assemblage of all those substances capable of preserving the aeriform state at the degree of temperature which prevails around the terrestrial globe."

The atmospheric fluids may be divided into three classes: the first comprehends *air*, the atmospheric fluid properly so called; the second consists of aqueous and other *vapours* suspended in the atmosphere; the third is composed of various *fluids* that are *aeriform*, or supposed to be such, which show their existence in the atmosphere, either visibly or by their effects. We shall consider the bodies comprehended under each of these classes only according to the relation which they bear to physical geography, referring such of our readers as are anxious for more detailed information, to those excellent treatises which have served as guides to us.

Air, which forms the greatest part of the atmosphere, is not a simple element.[b] Modern chemistry, by analyzing common air, and by again compounding it, has proved that there are two substances which enter into it in very different proportions, namely, 27 parts of *oxygen gas*, which was formerly termed *pure air*, and 73 of *azotic gas*, otherwise called *impure air*. Sometimes we find only 71 parts in the hundred of azotic gas, and 2 of *carbonic acid gas* or *fixed air*. But the carbonic acid being very soluble in water, is quickly absorbed by rain, so that its continuance in the atmosphere is but momentary; besides, its gravity confines it to the lower regions. On the other hand, *inflammable air*, which is now termed *hydrogen gas*, gains the superior regions of the atmosphere by its great lightness. This gas appears to rise even to a greater height than the *aerostatic balloons*, machines which owe to it their ascending force. Certain it is, that M. Gay-Lussac, at the height of 20,400 feet, filled a bottle with air, which was not charged with more hydrogen than that which we breathe.[c] [d]

It is only *oxygen gas* which is fit for animal respiration. But if it existed in too great a proportion, it would be the means of exciting our vital spirits to an excessive degree, it would exhaust our strength, and in fact make us live too fast. On the other hand, *azotic gas*, as its Greek name indicates, is incapable of supporting animal life. It is then the mixture of these two gases which renders the atmosphere so favourable for animal existence.

Plants and insects absorb and respire azotic gas; the former especially exhale oxygen gas, only however when they are exposed to the rays of the sun. Hence the reason why the air in a fine plain lightly shaded with wood is so salubrious; whereas, in the interior of extensive forests, we generally find the air very thick and unwholesome.[e] But we can no where enjoy air better fitted to support the vital powers in just equilibrium than at sea, where the continual motion of the air and the waters preserves the oxygen and the azote in due proportions.

The air is a fluid so extremely rare and subtle, that it becomes sensible to the touch, only when in motion, for example, when the wind is blowing. In its state of purity it is equally insipid and inodorous. According to rigid Newtonians, air is *transparent*, or rather *invisible*; and the azure colour of the atmosphere arises from the greater refrangibility of the blue rays of light.[f] Other philosophers imagine, that the blue tint is inherent in air, that is, that the particles of air have the property of producing a blue colour in their combination with light.[g]

The weight of the air has been made so much the subject of discussion, that we shall be very brief in our observations concerning it. Galileo has demonstrated the weight of air by the difference of weight between two vases that were filled, the one with compressed air, the other with air in its natural state.[h] The air pump, the ascent of water in a pipe, and the elevation of mercury in the barometer, are all so many proofs of this fact.

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[a] Herschell.

[b] Haüy, Traité de Physique, §§ 301—391.

[c] Libes, Dictionnaire de Physique, au mot AIR.

[d] We might ask then, what evidence there is to prove that hydrogen does rise into the highest regions of the atmosphere? It has been employed by some theorists, as a means of accounting, by its electric combustion, for the aurora borealis and other meteors.—P.

[e] Ingenhousz, Expériences sur les Plantes.

[f] Newton, Optice Lucis. Traités de Haüy, de Libes, etc.

[g] Goethe, Essai sur la Théorie des Couleurs. Comp. Bergmann, Géographie Physique, ii. 24. Fourcroy, Systême des Connaissances Chimiques, i. p. 118.

[h] The same thing might be better done, by exhausting a flask, by means of the air pump, and then weighing it.—P.

The pressure of a column of air reaching down from the extremity of the atmosphere to the level of the sea, is equal to the weight of a column of mercury of the same thickness, and of 28 inches in height. Take a tube of glass about a metre, or 3 feet 11 lines long, from 4 to 5 millimetres (about 2 lines,) in diameter, closed at one end, and open at the other; fill it with mercury, and applying your finger to the orifice, invert the tube, and place the open end in a basin containing mercury; withdraw your finger, and you will observe at the same instant the mercury descend in the tube to the height of about 28 inches. In the same manner, in our common pumps, the water rises to a height of 32 feet, (10.4 metres;) now, this height is to that of 28 inches, the height of the mercury, in the inverse ratio of the densities of water and mercury. One and the same cause then operates here. It can be nothing but the weight of the external air which acts upon the mercury in the basin.

The *barometer*, a well known instrument, depends for the principle of its construction upon the experiment which we have just now described. This instrument, which indicates the pressure or weight of atmospheric air, serves to measure the various elevations on the surface of the earth. The rising or falling of the mercury in the barometer, is inseparably connected with the density of the air, which varies according to the weight with which it is charged. It has been demonstrated, that when the densities are in geometrical progression, the altitudes are in arithmetical progression. We can thus ascertain the one from the other. The methods of calculation invented by Deluc, La Place, and Ramond, as well as the rules for correcting the errors occasioned by temperature, can only be fully developed in those treatises specially dedicated to the higher branches of physics.[a]

Physical geography ought, however, to express her gratitude to the exact sciences, for having brought to perfection an instrument, the multiplied use of which alone enables us, with facility and despatch, to form extended conceptions respecting the configuration of the mountains, plains, and valleys of our globe. The pressure which the air exerts on a man, the surface of whose body is 15 square feet, is 32,505 pounds, and the variation of a single line in the height of the mercury produces a change of 138 pounds in the pressure of the air. The diminution of the weight of the air upon very high mountains, combined with other circumstances, occasions vertigos, nausea, hemorrhages, and a feeling of universal uneasiness.[b] It is probable, that at a very great height, the extreme rarefaction of the air, the absence of azotic gas, and the abundance of hydrogen gas, would cause immediate death. The proportion subsisting between the weight of air, and of distilled water at the temperature of zero on Reaumur's thermometer, and with a mean pressure of 28 inches of mercury, according to the very accurate experiments of M. Biot,[c] is that of 1 to 770.30.

The air exerts a pressure equal on all sides, otherwise fragile bodies would soon be broken. The moment that the equilibrium of its parts is destroyed, by whatever cause, this property produces an instant exertion to re-establish it; and this is the principle of all its movements. It is also necessary to observe that the weight of the atmospheric air, in its ordinary state, arises perhaps in a great measure from the presence of various foreign bodies which are floating in it continually. Lambert, from the difference which is found between the actual propagation of sound, and that which theory gives, has estimated, that if we consider a cubic foot of air as composed of 684 parts, 222 of these, or nearly one-third of the whole, will consist of extraneous matter.[d]

The *elasticity* of the air is the property which it possesses of resisting the force of compression, and of recovering its original volume, or even a volume of greater dimensions, as soon as the compressing force ceases to act. We cannot exactly compute the limits of the compressibility and the dilatability of the air; we know, however, that they are of vast extent. Boyle affirms, that without the assistance of heat, he has dilated air 13,766 times.[e] Every one knows the manner in which air is compressed in an air-gun, and the force with which it can thus be made to impel a ball.

The less the elasticity of the air is counteracted, the larger the space it occupies; in other words, the more it dilates itself. Newton calculated, that at the height of 87 leagues, the air would be many thousand million times[f] more rarified than at the surface of the earth.[g] But this rarefaction must have limits. In proportion as the force, with which each particle tends to escape from those which are under it, becomes less than the force of gravity which draws it towards the earth, in the same proportion the spring or elastic power of the air will be gradually weakened. The dilatibility of the air must therefore have its boundary fixed at the point where these two opposite forces shall be equal. As we do not know to what extent the progressive rarefaction of the air is carried, we are unable of course to determine the precise height of the atmosphere. There are various methods of ascertaining it, which are all correct to a certain degree, but still insufficient to conduct us to a rigorous conclusion. If we agree with Deluc,[h] and regard the air as æther condensed by gravitation, it will follow, that if the earth were the only great body in the universe, its atmosphere would know no bounds. But, as there are other globes, air at a certain distance must commence to gravitate towards them, and, ceasing to dilate, condense itself anew. This however conveys to us no positive information. Astronomers avail themselves of refractions, which are sensible to 18 degrees below the horizon, but they vary with the temperature; however, by taking a medium, we may conclude the height of the atmosphere to be 228,000 feet, or between 15 and 20 leagues.[i] The barometer would furnish a sure and easy mode of resolving the question, if air was not compressible; but the different extent of strata, or portions of air, of the same weight, and the

[a] Laplace, Mecanique Céleste, iv. 293. Ramond, Memoires de l'Institut, Classe des Sciences, vi. 435. *sqq.* Haüy, Physique, § § 414—430.
[b] Saussure, Voyages, Nos. 559 and 2021.
[c] Haüy, Physique, § 394.
[d] Mémoires de Berlin, 1768.
[e] Wallis, Hydrostat. Prop. 13.
[f] "Un milliard de milliards," a trillion times.—P.
[g] Newton, Optice, Quæst. 28.
[h] Modifications de l'Atmosphere, vol. ii. p. 248.
[i] Lalande, Astronomie, vol. ii. p. 559.

pressure of heterogeneous bodies, render the calculation long and uncertain. Deluc has found that the height of the atmosphere, taken at that point where the mercury shall rise only one line, will be 150,600 feet, or about 11 leagues, and that where the mercury is elevated in the tube only one-tenth of a line, the height will be 213,030 feet, or about 15 leagues and a half.

The terrestrial atmosphere either dilates or compresses itself according to the prevalence of heat or of cold. Under the equator, the rarefaction produced by the rays of the sun unites with the centrifugal force in causing the atmosphere to swell in such a manner as to form around the earth a spheroid extremely flattened. Laplace imagines that the ratio between the two axes cannot, at its maximum, be less than that of 2 to 3. It is very natural to suppose that there is a kind of flux and reflux in the atmosphere, corresponding to the tides of the ocean. But D'Alembert and Boscovich have shown that the attractive powers of the sun and moon act but feebly upon so subtle a fluid as the atmosphere.[a]

The immense quantity of particles which terrestrial bodies emit by evaporation, rise into the air under the form of vapours. Under the equator this transpiration of the globe is very strong, and even the polar cold does not entirely prevent it. According to some philosophers, there exists a great difference between *tranquil evaporation*, by which only the particles of water, transformed into an elastic fluid, rise in the air, and *tumultuous evaporation*, in which the elastic vapours, disengaging themselves with great rapidity, carry along with them a great number of aqueous particles in their natural state.[b]

Tranquil evaporation, which takes place in temperate and cold regions, does not so much change the natural state of the atmosphere, as the tumultuous evaporation, which is in continual operation in the torrid zone. The aqueous particles, which are numerously diffused through the atmosphere in hot countries, deprive it of a portion of its caloric, and, consequently, of its elasticity, which renders it less sensible to every kind of commotion, and explains the great steadiness of the barometer in that zone. It is certain that neither the periodical rains, nor even the hurricanes, can disturb the uniform tranquillity which the barometer exhibits in the neighbourhood of the equator; whereas, the nearer we approach the pole, so much the more considerable do its oscillations appear. This variation of weight in the atmosphere in the temperate zones can be attributed only to the variations of elasticity produced by evaporation.

The different nature of terrestrial substances also, serves to modify evaporation. The azotic and carbonic gases abundantly disengaged from many rocks and earths, cannot be unconcerned in that chemical operation by which the atmospheric fluid is unceasingly renewed. A number of earthy particles, reduced to extreme tenuity, rise in the air, as is evident from the saline and sulphureous showers which sometimes fall. Even the quantity of evaporation depends upon the kind of substances composing the surface of the globe. Earth, mixed with water, furnishes more vapours than pure water;[c] owing undoubtedly to a sort of fermentation which disengages a greater portion of caloric.[d] From a similar cause, water evaporates more powerfully at the moment of its congelation. The air is impregnated with an immense quantity of vapours from numerous plants; the evaporation from the *helianthus annuus*, is 17 times greater than that from an equal extent of the surface of the human body. What then must be the influence of those thick forests which in many countries still cover such vast spaces!

The majority of natural philosophers having not yet with sufficient minuteness examined the various ways in which evaporation is modified, are content with affirming, that part of the water which rises in vapour is intimately mingled with the atmospheric air which dissolves it; this water is invisible; but when the air is saturated, the watery particles which continue to rise are no longer dissolved, but remain suspended in vesicular vapours, the union of which forms *clouds* and *mists*, and gives rise in general to all *aqueous meteors*. It happens also that a part of the water dissolved by the air, in disengaging itself anew, from whatever cause, assumes the form of vesicular vapours.

Aqueous meteors present themselves to our view under two forms: suspended in the air as mists and clouds, or falling to the ground like dew, rain, and snow. Cold, by condensing the vapours which are already elevated in the air; heat, by rarefying the air, and by disposing and exciting the vapours to disengage themselves and ascend from the earth, and, in short any change whatever in the physical constitution of the atmosphere,[e] produces that visible union of vapours termed *mists*, when they are extended over the surface of the earth, and *clouds* when they float in the air. In ascending to the summit of mountains the traveller frequently passes through a zone of clouds, and beholds the extensive vapours of which it is composed stretched under his feet like a vast plain covered with snow;[f] but even on Chimborazo, the loftiest mountain of the Andes, there are always to be seen, at an immense height, certain whitish clouds, resembling flakes of wool. These clouds, which are perhaps a hundred leagues from the globe, probably owe their elevation to the negative electricity with which they are charged, which repels them from the earth, while positive electricity occasions the mists to descend.[g] Deluc observed a very elevated cloud descend with rapidity towards the earth, scatter around a violent shower of rain, and then with equal velocity remount to its original height. This was evidently the effect of electricity.[h] [i]

[a] Mann, Mémoire sur le Flux et Reflux de l'Atmosphère, dans les Mémoires de l'Académie de Bruxelles, tom. iv.

[b] Hube, sur l'Evaporation, p. 49—52, 103, 402. (en All.) *Lichtenberg*, Magasin de Physique de Voigt, viii, 178, *sqq.* (en Allem.)

[c] Bazin, Mémoire de l'Académie de Paris, 1741.

[d] Is it not rather owing to the greater quantity of surface which the water thus moistening the earth, exposes to the action of the atmosphere?—T.

[e] Bergmann, Géographie Physique, § 113, 114.

[f] Reichardt Voyage aérien, Gazette de Berlin, Juin, 1810.

[g] Hube, sur l'Evaporation, chap. i. p. 291, *sqq.*

[h] Deluc, Modifications de l'Atmosphère, ii. 724.

[i] A nomenclature of clouds has been recently constructed by Mr. L Howard, founded on their various appearances. The following is a brief sketch of it: 1. Cirrus; resembling a lock of hair or a feather; the most elevated of clouds; generally white and thin; considered, generally, as an indication of wind. The mare's tail of sailors. 2. Cumulus; arranged in dense, convex or conical heaps; generally gathers in the afternoon of clear days, and disappears in the evening. 3. Stratus; a continuous level sheet of cloud; including mists and fogs, which

Mists are of two kinds, *dry* and *wet;* the latter are seldom to be met with in the torrid zone, but they continually brood over the polar regions. It is easy to account for this difference; the habitual compression of the atmosphere and its density being much greater towards the pole, vapours can rise and detach themselves from the earth. The *dry fogs*, according to some philosophers, arise from subterraneous vapours; they exhibit an intimate connexion with volcanic eruptions. Such was the case with the celebrated mist which in 1783 enveloped all Europe, at the moment when the volcanic fire made Iceland tremble, and immediately after the disaster of Calabria.[a] In 1755, before the dreadful calamity which befel Lisbon, a similar fog overspread the Tyrol and Switzerland; it appeared composed of earthy particles reduced to an extreme degree of fineness.[b]

Among the aqueous meteors which fall to the earth, none has given rise to more conjectures than *dew*, for it appears to have a two-fold origin; it may in part be produced from the transpiration of plants; but the greatest quantity is formed by the precipitation of vapours, which, during a warm day, have been elevated to a considerable height.[c] The influence of electricity in this phenomenon, is quite undoubted, although as yet indistinctly explained; for it is only after a day in which the air has been highly electrical,[d] that the dew is found in abundance; and it is no where formed in larger quantities than on the surface of bodies which are non-conductors of electricity, as glass and porcelain. Metals, on the contrary, appear to absorb it. There is hardly any dew in the polar regions, in dry climates, or on the seas in temperate zones. It is much more abundant in hot countries, where it is often a substitute for rain; but, in several places, it is equally hurtful to the growth of plants, and to the health of man, particularly in marshy countries, where the vapours which rise during the day are of a very unwholesome nature.

Hoar frost is dew frozen the moment it falls. When attached to trees stripped of their foliage, it presents the appearance of crystalline vegetation.

Rain falls from the clouds, when the vesicular vapours, of which it is partly composed, unite into drops. These drops, in our climate, are only a few lines in diameter, but in the torrid zone they amount to an inch. So that the difference which we remark between the ordinary rain and that which falls during a storm, appears to be only accidental, and the origin of both may be attributed to a diminution of electricity in the clouds. Mountains constitute so many points which draw off the electric fluid, and hence it rains almost continually in certain hilly countries, as on the eastern side of Norway and Scotland.[e] In those regions where thunder is unknown, as in the environs of Lima, and on all the coast of Peru, rain is a phenomenon equally unknown.[f g]

When aqueous vapours are congealed, either while falling, or when in the air previous to their falling, they form *snow*. The ordinary crystallization of sal ammoniac in little feathery crystals, presents phenomena similar to those which take place in the crystallization of snow.[h] "If," says M. Monge, "we fill a deep glass to which heat has been applied, with a saturated solution of sal ammoniac in a warm state, and then let it gradually cool in a calm air, the surface of the liquid will be the first to arrive at the point of supersaturation, as well from the direct cold which it experiences, as from the concentration which the evaporation promotes in that part; it is on the surface, then, that the first crystals are formed. These crystals, which are extremely minute, sink as soon as they are formed; and they descend with slowness, because their specific gravity is not much greater than that of the liquid which contains them, at the same time their volume increases by the addition of similar crystals, which are formed during their descent, so that they reach the bottom of the vase in large white flakes. The rapid progress of the crystallization is entirely owing to the affinity of the particles. The first crystal which begins to descend, forms, as it were, a rallying point, or nucleus, to all the particles which have a tendency to unite." By a reference to these phenomena, we may explain the formation of snow; the first crystals of which, produced at a great height in the atmosphere, determine, as they descend, by the excess of their specific gravity, the crystallization of aqueous particles, which, without their presence, the surrounding air would have retained in a state of solution. The result is the formation of stars of six rays, when the weather is sufficiently calm, and the temperature not too high to deform the crystals by melting off their angles; but when the atmosphere is agitated, and the snow falls from a great height, the crystals clash together, unite in groups, and form irregular flakes.

rise by night, and disappear in the morning. 4. Cirro-cumulus; a system of small roundish clouds, in close order; often resembling balls of flax with one end unwound; frequently consisting of several distinct strata, diminishing with their increase of altitude; a sign of fair weather. 5. Cirro-stratus; a horizontal undulating sheet, thinner at its circumference, thickening towards the horizon, often resting on hills and mountains, and prognosticating rain; generally accompanying halos, parhelions, &c. 6. Cumulo-stratus; formed by a union of the cumulus with one of the two latter forms; a cumulus flattened and projecting at its summit, or with a cirro-stratus settling above it; increases rapidly, and soon overcasts the sky; generally precedes thunder-storms, also snow-storms. 7. Nimbus; a dense cloud spreading above in a crown of cirrus, and passing beneath into a shower; the proper rain cloud.

These are the general forms of clouds, of which the three first are simple, the two next intermediate, and the two last compound. Besides these there are many other modifications, arising from the varied combinations of the simpler forms.—P.

[a] Beroldingen, Réflexions sur le grand brouillard. Brunswick, 1783, (en All.) Magasin de Physique de Gotha, ii. 9, iv. 114, v. 119.

[b] Lambert, Act. Helv. tom. iii. Bergmann, Géographie Physique, § 123.

[c] Dr. Wells has recently published a Theory of Dew, which is now generally adopted. He supposes it to be the result of radiation from the earth's surface into the higher regions of the atmosphere, by which the heat of the surface is generally found, in clear nights, from 7° to 12° below that of the atmosphere, a few feet above the surface. The air in contact with the surface is of course cooled down to it, and deposits its moisture, (air when saturated depositing its moisture by a reduction of 6°.) Dews are always heaviest in clear still nights, clouds acting as a screen to prevent radiation, and winds bringing a constant supply of warmer particles. They are also heaviest on bodies which radiate most freely, and on those which receive heat from the earth least rapidly, by slow conduction. Dews form on dry bodies, not in contact with the earth or any moist substance, and cannot therefore be the result of evaporation.—P.

[d] Du Fay, Mémoire sur la Rosée. Mémoires de l'Acad. des Sciences, 1736, p. 352.

[e] The western coast of Scotland, and indeed of all the British islands, is far more rainy than the eastern, owing to the almost continual moisture driven in from the Atlantic. The Grampian ridge serves as a shelter to the eastern coast, which has comparatively a dry climate. Nor is the country along the eastern coast of Scotland, so hilly as on the western.—P.

[f] Hube, sur l'Evaporation, chap. 51—56, p. 296—328

[g] Dews, however, are very abundant.—P.

[h] Monge, Annales de Chimie, v. p. 1. *sqq.*

Hail, according to all appearances, is a species of snow, or of snowy rain, which has undergone a variety of superficial congelations and meltings in its passage through different zones, some temperate, and others frozen. But what cause can produce these great variations of temperature? We answer, electricity, which, in combining oxygen and hydrogen, deprives them of part of their caloric.[a] Hail, accordingly, even that which falls in spring, is accompanied by marks of electricity.[b] It is by an electrical apparatus that we can produce artificial hail.[c] We may add, that volcanic eruptions are often followed by the fall of hailstones of enormous size.[d] The violence with which hail is discharged upon the earth, under an oblique angle, and independently of the wind, would be explained by supposing, with the celebrated Volta, two electrical clouds drawn towards each other in a vertical direction, and by their shock producing hail, which, by the law of the composition of forces, would then be projected in the diagonal of its gravity, and of the resultant of the two directions of the clouds.

Such are the principal circumstances which natural philosophy has supposed to concur in the formation of aqueous meteors. Their beneficial influence upon the earth is a point more easy to determine. We observe all nature languish, when the atmosphere retains for too long a time the fluid arising from the earth. Plants fade and droop; animals feel their strength failing them. Man himself, breathing nothing but dust, can with difficulty procure shelter from the sultry heat by which his frame is parched and overpowered; but scarcely have the waters of heaven descended from the clouds, when all living beings begin to revive; the fields resume their green attire, the flowers their lively tints, animals the sportive freedom of their motions, and the elements of the air their healthful equilibrium. Snow itself, whose very name alarms the natives of the tropics, is productive of real advantages in the economy of nature; it secures the roots of plants against the effects of intense cold; it serves gently to moisten those lands from which, owing to their local situation, the rain is too soon carried off; and it paves for the inhabitant of the north commodious and agreeable roads, along which he gayly skims in his light and nimble sledge; whilst the occupants of the south, living under a cloudy sky, are strangers to the enjoyments both of winter and of summer. Hail alone, of all the aqueous meteors, never appears but as a harbinger of distress. Birds and quadrupeds instinctively conceal themselves, as soon as they have any presentiment of its coming.[e] Man can neither foresee its approach, nor arrest its ravages; he has been able to ward off the thunderbolts of the sky, but he sees the hail destroy his corn, break his fruit trees, and shatter the very house where he dwells, without being able to prevent it.[f]

Excess of humidity might soon become hurtful to the earth, but it is difficult for such excess to take place; the quantity of atmospherical water diffused by aqueous meteors varies according to the climate. At Paris, it has been found that there annually fall 24 inches of rain-water and of dew; at Iolmezzo, in Friuli, the quantity of rain alone amounts to 82 inches; at Carfagnana, in the Apennines, to 92; there fall at Grenada, 105; and at Leogane, in the island of St. Domingo, 150 inches. It is probable that in every place the quantity of water evaporated, determines that which descends from the atmosphere.[g]

The salutary effects of aqueous meteors are modified by the chemical qualities of the waters of the atmosphere. The salt rain and dew in the environs of the Caspian Sea, owing to the vapours which arise from a soil impregnated with different kinds of salt,[h] probably contribute to those saline efflorescences, which, according to M. Olivier, are gradually overspreading the once fertile soil of Persia. They are so strong, that in a cold summer night, you may see them on the camels, under the appearance of hoar frost containing sal-ammoniac. In the west of Jutland, we may perceive saline fogs arising from the sea, which consume the foliage of trees, and put a stop to their growth, without being pernicious to that of grass.[i] In France, the autumnal fogs, charged probably with electricity, hasten sometimes the maturity of the grape.

Among the aqueous meteors, there are some which were once considered as miraculous, but which more exact observation has entirely divested of their supernatural character. Such are *showers of blood*, which take place when the rain water draws with it a great number of certain red insects, which float in the atmosphere, or swarm on the earth. *Showers of sulphur* may

[a] Journal de Physique, ou Observations, &c. de Rozier, 1778, Sept.—Cotte, Journal General de France, 1788, No. 95. Magasin de Gotha, vi. &c. Libes, Dictionnaire de Physique.

[b] Senebier, Journal de Physique, 1787, Mai.

[c] Quinquet et Seiferheld, Magasin de Gotha, vi. 189; vii. 45—47, &c.

[d] Stephenson's Picture of Iceland, p. 307, (in German.)

[e] Cours complet d'Agriculture pratique, par Rozier, Sonnini, &c. art. *Météorologie*.

[f] By the recent invention of *Paragréles*, means have been discovered for preventing the ravages of hail. From the reports collected by the Linnean Society of Paris, it appears certain, that where *Paragréles* have been erected over a considerable district, they have either averted the hail-storms, or converted them into snow, sleet, or rain; and that while the adjoining districts have been ravaged, the hail has scarcely passed at all beyond the 2d or 3d rows of the paragréles, and even what has fallen without these, and within the 1st row, has been so softened as to do little or no damage. The Paragréle consist of a pole from 20 to 40 feet high, firmly fixed in the ground, and surrounded with a braid of straw, in which are twisted a number of threads of brown linen twine, and surmounted by a piece of pointed wire, about 1 foot long, fastened to the twine and rising above the top of the pole. This is the apparatus generally used in France. In Italy and Switzerland, they more generally use metallic wires instead of straw and twine. Copper and brass are better conductors than iron. They act on an electric principle, by gradually drawing off the electricity from the clouds, and so dissolving them, and preventing the formation of hail. The use of straw as a conductor, or rather its application to lightning rods, was first ascertained by M. L'Apostelle of Amiens, in 1819. It was first employed for Paragréles in the country near Amiens. Modified by the twine, which increases its power, it was successfully applied by M. Thollard, in the Dep. of the High Pyrenees, (1821.) It was introduced into Lombardy by Beltrami, into the Pays de Vaud by M. Chavannes, and into Savoy by M. St. Martin; and the apparatus, either with straw or wire, is now extensively and successfully employed in Italy, Switzerland, Bavaria, and S. Austria. It is less used in France, though, calculating from the saving it has effected in the districts where it has been employed, it has been estimated, that if generally used, it would save France yearly the sum of 50 million francs.—P.

[g] Delamétherie, Théorie de la Terre, sect. 1254. Cotte, Météorologie. Hales, Vegetable Statics. Mémoires de Sedilleau (Academie de Paris,) de Wargentin (Academie de Stockholm,) &c. &c.

[h] Gmelin, Description de la Russie, iii. 11, 12.

[i] In violent storms from the sea, the salt water is often carried far into the interior, and proves very destructive to vegetation, immediately exposed to it. This has often occurred in the violent equinoctial storms from the S. E. along the coasts of the U. States.—P.

actually have occurred, even independently of volcanic eruptions, as the air contains carbon and sulphuric gas, which, combined by caloric, form sulphur.[a] In the month of May, 1646, their rained at Copenhagen a kind of substance, which, on being examined by the philosophers of that day, appeared to be a mineral sulphur;[b] but the same phenomenon recurring in 1804, and in the same month of May, the philosophers of the present age, after analysing the precipitated matter, perceived only a vegetable substance nearly resembling the *semen lycopodii.*[c] The phosphorescence of this substance, at the moment of the rain, which happened during the night, presented an alarming spectacle. Other examples concur in showing that sulphurous showers are in general nothing but the fall of a vegetable powder, taken up by a water-spout; a phenomenon which we shall hereafter describe. At Bourdeaux, in 1761, the wind raised, and bore through the air a cloud composed of a sort of yellowish dust, covering the stamina of the flowers of the pine-trees in the neighbouring *landes.*[d] Hurricanes too have sometimes lifted up sheaves of corn, as well as animals of small size, such as locusts and toads, which, falling at a considerable distance, have frightened the peasants. The most frightful phenomenon of this description, a shower of fire, has been twice observed by a celebrated naturalist, who declares he saw nothing more than rain very strongly charged with electricity, and which sparkled on touching the ground.[e f]

We come now to consider luminous meteors; and first as to those which, according to the principles of common physics, depend on refraction and reflection.

The solar rays, say the Newtonians, in passing from a rare into a dense medium, undergo an inflection, a deviation from the direct line of their course, which is termed *Refraction:*—the seven visible rays have different degrees of refrangibility: the red rays have the least; then come in succession the orange, the yellow, the green, the light blue, the indigo, and the violet. All bodies, which are visible without being luminous or transparent, have the property of *reflecting* light, that is, of repelling it, and throwing it back. Even the clouds and the air possess this property. The rays, which have most refrangibility, are also the most reflexible. These two causes present us with the most delightful and the most majestic spectacles in nature. If the sky shines with a beautiful azure hue, it is solely the effect of the rays of blue, indigo, and violet, which are first reflected from the earth, and afterwards returned to us by the atmosphere.

The refraction of light enables it to diffuse itself gradually over our hemisphere, obscured by the shades of night, long before the sun appears, even when that luminary is 18 degrees below our horizon. The *twilight* and the *dawn* confer a substantial benefit on the labourer, the navigator, and the wretched inhabitants of the frozen zone. By their means the two poles enjoy the so lar light for nearly the space of nine months. The sun himself appears by refraction above the horizon before he actually arrives there.

The brilliant tints which accompany the *rising and setting of the sun*, originate from this, that the air towards night and in the morning is considerably condensed, and loaded with a variety of vapours. The very refrangible rays seldom or never reach us. The red and yellow have alone inflexibility enough to penetrate through the atmosphere, and to render the vapours and clouds so many moveable mirrors. This then is the reason why the sun appears so often to be red, morning and evening. The delightful spectacle of the dawn and of twilight is almost entirely denied to those who live in the regions of the equator, where the sun rises in a direction nearly vertical. It is towards the poles that these reflected splendours of that great luminary are longest visible, often changing the whole of the night into a magic day, of which the inhabitant of the south of Europe can form no adequate conception.

Parhelions, or false suns, are phenomena less common. We see by the side of the sun, often above and below, several images of that luminary, more or less bright. These *false suns* are sometimes surrounded by a circle of pale light; sometimes adorned by the colours of the rainbow; most commonly they are not exactly circular, and some have been observed with luminous trains. This meteor has never been seen at the same time in a number of distant places; it exhibits a different appearance even to spectators who are near each other; it is therefore an optical illusion. As it snows and hails generally at the very time when a false sun disappears, it is supposed that it is in a mass of little spires [*needles*] of ice suspended in the air that the image of the sun is reflected; the rays pass probaby through an opening between thick clouds, as when one lets fall the solar image in a camera obscura.[g h] There are also false *moons.*[i] These illusions can scarcely take place only when the sun, being distant from the zenith, darts its rays obliquely upon the atmosphere; accordingly, almost all the parhelions occur either in the morning or the evening. False suns are often observed in countries where a damp cold prevails. These are frequent phenomena in Greenland; and we are assured, that in the environs of Hudson's Bay, the sun, when rising, generally appears to have a tail.

The *rainbow* has a near affinity to parhelions, and generally accompanies them. Every one knows that this magnificent arch, so wonderfully coloured, is the effect of the seven solar rays refracted in drops of water suspended in the air, and reflected upon a dark cloud, as upon a canvass. It is to treatises on optics that we must refer our readers for an explanation of this phenomenon.[k]

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[a] This assertion appears to be ill-founded. The author can only mean that the carbon detaches the oxygen of the sulphurous acid (gaz sulfurique?) and leaves the sulphur free; else the language here used is entirely erroneous.—P.

[b] Wormius, Museum, lib. i. cap. 9, sect. 1.

[c] Mémoires de Viborg et de Rafn.

[d] Sigaud Lafond, Dict. des Merveilles de la Nature, tome iii. p. 196.

[e] Bergmann, Géog. Physique, ii. 45, sect. 115.

[f] These electric showers are not unfrequent. The phenomenon has been observed both in snow and rain.—P.

[g] Huyghens, Dissert. de Coronis et Parheliis, in Op. Relict. ii. Bergmann, Géographie Physique, § 122.

[h] Parhelions are extremely common in the arctic regions. They were almost constantly observed by Capt. Parry in his late voyages. Indeed all the optical phenomena are more striking in the higher latitudes.—P.

[i] "*Paraselènes.*"

[k] Haüy, Traité de Physique, § § 955—975. Comp. Observations sur l'Arc-en-Ciel, suivies de l'application d'une nouvelle Théorie, &c. par M. l'Abbé P. Paris, 1788.

What is termed the *apotheosis* of travellers, is a phenomenon much akin to that of the rainbow. The academicians Bouguer, Godin, and La Condamine, when standing upon the very elevated mountain of Pambamarca, in Quito, saw their own image reflected in a very light fog, and surrounded by several concentric circles, ornamented with the colours of the rainbow. The *Spectre of the Brocken* is an optical deception of the same kind.

The "*Mirage*," or appearance of objects which are not actually in the horizon, or which exist there in a different situation, is one of the most remarkable of optical illusions. At sea, rocks and sands concealed under the water, appear as if they were raised above the surface. The Swedish sailors long searched for a pretended magic island, which from time to time could be descried between the isles of Aland and the coasts of Upland. It was a rock elevated by the mirage.[a] At times the English have seen with terror the coasts of Calais and Boulogne apparently approaching the shores of their island. Vessels sometimes present themselves to the view, as if they were upset, or as if sailing in the clouds.[b] The most celebrated example of this phenomenon is that which is frequently seen in the straits of Messina, and which the people attribute to the fairy Morgana, *Fata Morgana*. The spectator, standing on the Italian coast, perceives, upon an inclined plane, formed by the waves driven towards the middle of the strait, images of palaces, embattled ramparts, houses and ships, at one time turned upside down, at another confusedly set up again, and presenting the spectacle of towns and landscapes in the air.[c] Of all the effects arising from this cause, that which has been most thoroughly examined, is the optical illusion which the French experienced in the deserts in the vicinity of Egypt; the sandy plain, covered in the distance by a thick vapour, presented the deceptive image of a vast lake, towards which they eagerly hastened, but which appeared to fly before them.[d] All these fantastic optical appearances, worthy of exercising the acuteness of philosophers, who unquestionably will trace through each of them only the varied effects of a single cause, can be but briefly specified in a treatise of physical geography.

The *zodiacal light* deserves our particular attention. It is a grand phenomenon, which must be referred either to the nature of the terrestrial atmosphere, or to the position of the globe with regard to the sun. This light, which exists constantly under the equator,[e] presents itself after sunset, under the appearance of a serene whitish clearness, of a lenticular form, having its base turned towards the sun, and its axis in the zodiac. Mairan has supposed, that this light was the atmosphere of the sun;[f] but this explanation, so generally admitted, is totally rejected by M. de La Place. This illustrious geometer observes, as we think very justly, that the atmosphere of the sun cannot have a lenticular form, nor be extended beyond the orbit of Mercury, whilst the zodiacal light appears to extend itself even beyond the terrestrial orbit.[g] If we were permitted, in a work of this description, to develope new opinions in physics, we should endeavour to render it probable, that the zodiacal light is nothing else than the luminous fluid belonging to the terrestrial globe, attracted by the sun in the direction of his apparent daily path, and which, being accumulated upon the line of that direction, becomes visible at the moment of the decline of the sun. This efflux, forming an elliptic belt, the great diameter of which is always directed towards the sun, must present itself under a lenticular figure, the broadest part of which is turned towards that luminary. It is true, that this explanation supposes that the luminous fluid, diffused throughout the universe, accumulates around the celestial globes in the ratio of their mass and density, which as yet is only an uncertain hypothesis.

Among the *igneous meteors*, of which we are now about to treat, *thunder* occupies the first rank. It is universally known to be the effect of electricity, the theory of which must be studied in philosophical treatises. We have seen, that the all-powerful agency of the electric fluid is sensibly present in the air, in rain, snow, hail, and in the clouds which float in the midst of the atmosphere. These bodies receive their electric properties from the hand of nature, in a manner not exactly known, though the experiments of Lavoisier and La Place have unquestionably proved, that terrestrial bodies, in evaporating, carry up from the earth a part of the electric fluid which belongs to it. It is to the celebrated Franklin we owe the direct proof of the electricity of the atmosphere. He was the first who was bold enough to make an experiment on the clouds, and to draw down the lightning from the sky.

The electricity of the clouds in storms is almost always that which philosophers term *vitreous* or *positive*; it augments in proportion as we ascend in the atmosphere, and consequently ought to be very strong in that part of the air which gives birth to storms. The whole terrestrial globe may be looked upon as a vast reservoir of both kinds of electricity, but more frequently of the resinous or negative. As long as these two bodies remain in their natural state, the two electricities consequently are in equilibrium, and at rest; but if one of these two bodies, whether it be the earth or the atmosphere, acquire an excess of the electric fluid, there is no longer an equality between the repulsive and the attractive powers. The excess of the fluid is discharged in the form of a flash. This constitutes lightning, which is either *descending* or *ascending*. We sometimes observe these two kinds of lightning almost at the same moment, the earth and the atmosphere appearing to make a mutual exchange of their surplus electricity. The flash, which is attracted and conducted by metals and moist bodies, in preference to other substances, commits ravages which, from our inability to observe them with coolness, still remain in circumstances of obscurity; here, the lightning kindles rapid and devouring flames;

[a] Mémoires de l'Académie de Stockholm.
[b] Minasi, Gilbert, &c. Voyez le Mémoire sur les Fata Morgana, qui paraitra dans les Annales des Voyages.
[c] Philosophical Transactions, 1799.
[d] Monge, sur le Mirage, dans les Mém. d'Egypte, i. 64.
[e] Horner, Astronomie de l'Expédition de Krusenstern, dans Zach Correspondance, x. 211, 219, 340, (avec une figure.)
[f] Mairan, Traité de l'Aurore Boréale, p. 12.
[g] Laplace, Système du Monde, lib. iv. c. 10.

there, it bends and shivers the objects which it meets with. Sometimes it instantaneously deprives animals of life, and sometimes it passes over the clothes without injuring the person.

A kind of periodical flux and reflux has been observed in the electrical fluid of the atmosphere. In summer, when the earth is dry, and the day warm, droughty, and serene, the atmospheric electricity increases from sunrise till mid-day, when it arrives at its *maximum*, then it remains stationary for a couple of hours, and afterwards diminishes until the fall of the dew. Towards midnight, it revives, to be again almost entirely extinguished. In winter, the *maximum* of electricity is at eight o'clock in the morning and evening; it is weaker during the day. In all these variations, atmospherical electricity seems very exactly to follow up the development of hydrogen gas, which is more or less considerable at different periods of the day.[a] Electrical phenomena are more prevalent in some quarters of the globe than in others. Towards the poles, the disengagement of hydrogen gas is extremely scanty, and there is also no continual friction between the earth and the atmosphere. Thunder, accordingly, is rarely observed in those regions; it is only a weak decrepitation. As we advance towards the equator, hydrogen gas becomes more abundant, and at the same time the storms are most violent. It is under the line, that we meet with that vast extent of sea where thunder storms almost constantly prevail. There are, however, countries under the line, in which it rarely thunders. If thunder seems to be particularly attracted towards marshy places, may not the cause be found in the presence of the inflammable gas of marshes, which is only an impure species of hydrogen gas? It is supposed that there are, in the electric fluid of the globe, two currents, the one from the poles towards the equator, the other in an opposite direction. This is a very probable hypothesis.

Storms, notwithstanding the calamities which they frequently occasion, and which the thunder-rod cannot infallibly prevent, deserve to be considered as one of the greatest benefits that our Creator has bestowed. They diffuse freshness through the atmosphere when it is in a confined and sultry state; the plants resume their lively green, the flowers raise their drooping heads when their thirst has been quenched by the rain, the crops and fruit, penetrated by new warmth, ripen more rapidly, and man silently adores the Great Being whose power has been displayed.

We now proceed to consider other igneous phenomena, none of which possess the dreadful energies of thunder.

The *aurora borealis*, so often celebrated by Ossian, presents a spectacle equally magnificent and astonishing. In these bloodstained and fiery meteors, what poet is there who could not discover the shades of warriors, who, once conquerors of the earth, and now rulers of the air, stoop from the clouds to behold the combats of their posterity? Are not those pale and soft lights the daughters of heroes who, cut down in the early bloom of their beauty, now float upon the wings of the wind? We hear their sighs, and the rustling of their resplendent robes; and we see, rising towards the zenith, and assembling on every side, the luminous columns of the wandering palace of departed spirits. But we must leave to the painter and the poet the delineation of such enchanted scenes, and confine ourselves to a more rigorous and sober description.[b] The aurora borealis, in our European countries, uniformly appears in the north, and inclining generally a little to the west. In Greenland, they sometimes perceive this phenomenon towards the south. In the other hemisphere it is observed, but with a feeble lustre, in the direction of the south pole. The ancients appear to have described it under the name of *lamps*, or *burning torches*, and other designations. In our age, it is a rare occurrence in the temperate zone, and becomes common only towards the 60th degree of latitude. It commences generally three or four hours after sunset, and is preceded by a sombre cloud, nearly resembling the segment of a circle, of which the horizon forms the chord. This segment, seen at Upsal, for example, is of a deep black, whilst in Lapland it appears grayish, or even becomes almost invisible. Its circumference is very soon bordered with a whitish light, which sometimes appears gently to expire. Most frequently the cloudy segment opens in chinks, whence issue streams and rays of light, of a yellow, a rose, a purple, or a sea-green colour. A general movement agitates all the cloudy and enlightened space; rays becoming more and more bright, shoot across each other like lightning flashing in the midst of effulgent splendour; by degrees, there is formed in the zenith a luminous crown, which seems to be the central point of all the motions of the luminous matter. After having occupied, for the space of an hour or two, almost the whole expanse of the heavens, the phenomenon contracts itself at first on the southern side, afterwards on the west and the east, and finally disappears towards the north. The rising sun invariably extinguishes these rival luminaries. The further we remove from the pole, the less distinctly do we perceive these different appearances of the aurora borealis. It generally appears in France, only like a light not much elevated above the horizon.

Philosophers have given different explanations of these phenomena. That which Professor Libes lately proposed, appears to unite simplicity to probability.[c]

This philosopher lays down the six following principles: 1st, If the electric spark be transmitted through a mixture of azotic and oxygen gas, the result is the production of nitric and nitrous acids, or of nitrous gas, according to the proportion subsisting between the oxygen and azote which compose the mixture. 2d, Nitric acid acquires additional colour and volatility from being exposed to the sun. Scheele first observed this phenomenon, and M. Libes has made frequent observations on the subject. Having placed a glass receiver over a saucer containing nitric acid, and having exposed the whole to the sun, he observed that the acid became coloured, and that the receiver was filled with reddish-looking vapours, which remained in it a long time, diffusing a lustre similar to that of the aurora borealis. 3d, In vials containing nitrous acid, we always perceive above the acid a very

[a] Saussure, Voyages, sect. 800, 803 831. Lemonnier, Mém. de l'Académie, 1752, p. 240, 241. Beccaria, Electricité terrestre, sect. 1087.

[b] Mairan, Traité des Aurores Boréales, p. 115. Bergmann, Géog. Phys. ii. 96—104.

[c] Traité de Physique, par Libes, tome iii. p. 309.

red and very volatile vapour, which never condenses. 4th, Nitrous gas, when in contact with atmospherical air, emits deep red vapours, which fly away into the atmosphere. 5th, The hydrogen gas which is disengaged from the surface of the globe, occupies, in the higher regions of the atmosphere, a place marked out by its specific gravity. 6th, The solar heat has but little influence in the polar regions. In reflecting upon these principles, it is easy to perceive, that the production of hydrogen gas being extremely scanty, if at all occurring, in the polar regions, the electric fluid in flowing back from the equator towards the pole, must pass through a space occupied only by a mixture of azotic and oxygen gas; that the electric spark fixes and combines these two gases; that this combination ought to cause the production of nitric or nitrous acid, or of nitrous gas, according to the proportion which prevails between the two component gases; and that the gas and the acids thus formed, should exhale red and volatile vapours, which give rise to the phenomena of the aurora borealis. If these phenomena do not occur in the temperate zones, the reason is, that in their strongly heated atmosphere, there is always to be found a mixture of oxygen and hydrogen gas, which attracts the electric spark, thus occasioning thunder and lightning. These two phenomena are not known in the polar regions, from their deficiency in hydrogen gas.

The observations of the elder Gmelin, in his travels in Siberia, tend to confirm the opinion of M. Libes. As we advance into eastern Siberia, the aurora borealis becomes more frequent and more dazzling; and it would seem that the frozen regions, between the Jenissei and Cape Behring, are the native country of these phenomena. Now, that is exactly the quarter of the old continent where the cold is most intense, and consequently where least hydrogen is disengaged.[a]

This explanation, however, does not account for several circumstances of the phenomenon; among others, for the blackish segment which forms the base. We must wait until enlightened observers have applied the principles on which it is founded to a certain number of these phenomena. We would ask these observers, whether the aurora borealis might not be in some measure the effect of one of those optical illusions of which we have been speaking, viz. the mirage? and whether the circular segment be not the image of the terrestrial globe itself, repeated in the nocturnal atmosphere? And then the luminous rays which appear to issue from this cloudy segment, would in fact issue from the earth itself. This is a solution which we submit to the examination of philosophers.

Other igneous phenomena recal us towards the surface of the earth. We know that animal substances, in a state of putrefaction, always emit phosphorus, which, taking fire from the contact of the atmosphere, produces light and wandering flames. Such is probably the origin of those *ignes fatui*, which flutter at night over church-yards and fields of battle, and which have given rise to pretended apparitions of spirits in churches where it is the pernicious custom to accumulate the remains of the dead. Hydrogen gas is often combined with phosphorus; this mixture is not fit for respiration; it quickly suffocates. This is also a circumstance which seems to enter into many histories of spirits and apparitions. An inflammable air is also disengaged from marshes, which is hydrogen gas mixed with azote. The air which inflames on the surface of certain springs, known by the name of *burning fountains*, arises from the presence of hydrophosphoric gas, or as it is otherwise termed, phosphuretted hydrogen. One of these springs is met with in the parish of Saint Barthélemy, in the department of the Isere. The disengagement of inflammable gas during the summer, is so considerable, that we continually see a flame seven feet high; and travellers, when they first behold it, imagine that a whole village is on fire.[b]

Ignes fatui, arising from the development of phosphuretted hydrogen, are necessarily soon extinguished; a succession of these fires will therefore appear to the spectator to be one single flame, which moves with rapidity from place to place, when we attempt to approach it. The air, driven on before us, forces the lambent flame to recede.[c] There are other similar fires, which appear to be immoveable in one particular spot. There was one near Rettwick, in Sweden, which was supposed to issue from the mouth of a dragon that kept watch over some hidden treasures. A simple miner ventured to sink a shaft, which discovered a cavern filled with sulphurous pyrites and petroleum, the combustion of which had occasioned the phenomenon.[d]

Falling, or *shooting stars*, are appearances every where observed. They are probably the effect of hydrogen gas more or less sulphuretted, for phosphorus is too rapidly inflamed, by the contact of the air, to be capable of reaching so great an elevation. What seems to prove the hydro-sulphuretted origin of these meteors, is the nature of the circumstances by which they are accompanied. These fires, we are assured, often fall to the ground; and nothing is found at the place of their fall but a fetid, glutinous matter, of a whitish colour, bordering upon yellow. Now, we know that sulphuretted hydrogen gas holds sulphur in solution; that the hydrogen and the sulphur do not burn at the same moment; that, consequently, the sulphurous part may be precipitated to the earth, whilst the hydrogen, mixed with the oxygen of the air, is kindled by a slight electric spark.

The *Fire* of *Saint Elmo* is generally considered as an accumulation of electric matter around a point, which moves in the air. This fire, then, may be expected to appear frequently at the top of the masts of a vessel sailing along with rapidity. The ancients observed this phenomenon. These fires, when seen in pairs, were called *Castor* and *Pollux;* when the flame was single, it bore the name of *Helen*. The spears of an army often appeared ornamented with these electrical plumes.[e] A Swedish naturalist, travelling on horseback in snowy

[a] The *aurora* is more generally considered as an electrical phenomenon; its light resembling that of electricity passing through a vacuum, generally accompanied by a crackling noise, and a highly electric state of the atmosphere. It is also magnetic; its beams generally following the line of no variation, or the magnetic meridian.—P.

[b] Bouvier, Journal de la Médicine Ecclairee par les Sciences Physiques, tom. iii. No. 8.

[c] Derham, Philosoph. Transact. No. 411.

[d] Mémoires de l'Académie de Stockholm, 1740. Bergmann, Géog. Phys. ii. 80.

[e] Homer, Odyssey, xx. 133. Cicero, de Divinatione, i. 18. Virg.

weather, saw his fingers, his switch, and the ears of his horse covered with a fire of this description.[a]

Globes of fire present a spectacle much more imposing than all the preceding phenomena; they are seen of an immense size; their light is sometimes red, but oftener of a vivid and dazzling whiteness, like the flame of zinc mixed with nitre: they move with the rapidity of lightning, and appear to belong to the higher regions of the atmosphere, as they have been observed at the same time in places very distant from one another. This, however, may be only a consequence of their rapid flight, sometimes shooting along at the rate of six leagues in a second. We see them often in the space of a few seconds appear, traverse the horizon, blaze like fire-works, then break in pieces, or discharge torrents of flames, with a detonation that shakes the air and the earth at the moment of their explosion. There are some which are precipitated like a thunderbolt, break through the roofs of houses, destroy animals, or dismast and shatter vessels. At other times, they move over the earth like a whirlwind of flame, set fire to trees, devour, or at least overthrow, every thing which obstructs their course. They are occasionally accompanied with lightning. Electricity and hydrogen, perhaps also nitrous gas, seem to act here an important part; but the appearance of these phenomena is so momentary, that we cannot examine them with the requisite care. It is only, then, on hypothesis, that we consider the stones thrown down from the air as the nuclei of these little comets of the terrestrial atmosphere; this hypothesis, however, possesses a considerable portion of probability.[b]

All the phenomena which we have just been considering, appear attended with brightness, and even with noise. There is one, however, which presents itself to our notice, as the result of a gentle, invisible, and noiseless force, but which is diffused over the whole of the terrestrial globe: I allude to *magnetism.* This phenomenon is very little understood as to its real nature—all that we know is reduced to this: there appears to exist a substance, or force, of some kind or other, which exercises an influence probably over all terrestrial bodies, but which is chiefly shown as it acts upon the ore of oxidulated iron, called loadstone. These substances, presented to each other, are mutually attracted at one end, and repelled at the other: they constantly turn these two points, in which their magnetic action is concentrated, towards the two poles of the world: they communicate by friction, or by contact, this power to bars and needles of iron, or rather of steel; so that such a *magnetic needle* indicates by one of its points the north, and by the other the south, allowing for some deviation. This phenomenon of the direction of loadstones is attempted to be explained by supposing that the globe itself is a great loadstone, which exercises its magnetic force upon all bodies more or less sensibly. We shall not enter upon the discussions to which this hypothesis must lead.[c]

The earth, considered as a great magnet, has poles and an equator different from those which its shape and its rotation give to it. It is this which the two kinds of deviation observed in the magnetic needle demonstrate.

The deviation, or the angle that the axis of the magnetic needle makes with the meridian of a place, is termed its declination. It is either west or east, and varies in different parts of the globe, at different times of the year, and even at different hours of the day. These diminutions and augmentations seem to vary periodically; and the variations are very considerable. At London the declination was 11 degrees, 15 minutes east in 1580-1; in 1657 the needle pointed directly north; in 1692 it already indicated 6 degrees of western declination; and in 1799, this declination increased to 21 degrees. In 1666, there was none at Paris; in 1795, it amounted to 22 degrees, 30 minutes towards the west. We find upon the globe certain series of points, in which there is no declination; but these *lines without declination* change their position every year. We are obliged to revise the magnetic maps every 10 or 12 years.

The diurnal oscillations are also considerable. Celsius observed a variation of 12 minutes in an hour, and from 2 to 7 minutes in the 24 hours. The experiments of Cassini, made at Paris, give the following interesting result. From 8 o'clock in the morning, until 2 in the afternoon, the direction of the needle approaches the meridian; it afterwards deviates until 9 in the evening, and remains stationary during the night. The sum of the oscillations towards the west exceeds that of the movements in a contrary direction.

The *inclination* consists in this: the magnetic needle, which, under the equator, generally supports itself in the horizontal equilibrium, which is given to it when placed on the pivot, deviates from its horizontal position, as it approaches the poles; one of its extremities always dips towards the nearest pole. The greatest inclination yet mentioned is that of 82 degrees, observed by Phipps, in the latitude of 79 degrees, 44 minutes north. According to the observations of M. de Humboldt, the intensity of the magnetic forces, and above all, the inclination augments as we go from the equator to the poles, whilst the aerial traveller, Gay Lussac, has proved, that at 21,600 feet above us, they were the same as upon the earth.

The circle which coincides with the vertical plane, passing through the direction of the needle, is called the *magnetic meridian:* the points where all these meridians would cut each other, would be the *magnetic poles* of the earth. A great circle, upon which there is no inclination of the needle, will be the *magnetic equator.* According to the researches of the celebrated Biot,[d] the magnetic equator now forms, with the terrestrial equator, an angle of 10 degrees, 58 minutes, 56 seconds; its

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Georg. i 478. Pliny, Hist. Nat. ii. cap. 37. Seneca, Quæst. Nat. i. 1. Cæsar, Bell. African. 6. Livy, xxii. 1.

[a] Forskal, in Bergmann, Geogr. Phys. § 130.

[b] See Book xi. p. 96.

[c] Æpinus, Tentamen Theoriæ Magneticæ; les Mémoires de Coulomb, membre de l'Institut; ceux d'Euler, dans les Mémoires de Berlin, 1751 1755, et 1757; les Mém. Suédois pour les années 1750 et 1768, avec la carte de Wilke; the Transactions of the Royal Irish Society, vol. iv. Dublin. Van Swinden, Mémoires sur l'Analogie de l'Electricité et du Magnétisme. Haüy, Physique, § § 720—832.

[d] Mémoires de Humboldt et Biot, sur les Variations du Magnétisme terrestre à différentes latitudes. Journal de Physique, Frimaire, an xiii. p. 244, *sqq.*

western node on the terrestrial equator is at 120 degrees, 2 minutes, 2 seconds, to the west of Paris, that is to say, near the Gallapagos Islands, in the South Sea; consequently, its eastern node is at 59 degrees, 57 minutes, 55 seconds, to the eastward of Paris, in the Indian Ocean. The magnetic equator descends to the southward of the terrestrial equator in the Ethiopian Ocean, and rises to the northward in the great Eastern Ocean. Thus, a northern hemisphere projected upon the magnetic equator, would present a still greater excess of land above the opposite aquatic hemisphere, than a northern hemisphere, already projected upon the terrestrial equator—a circumstance which, joined to the magnetic direction of several chains of islands, presents to our notice the great agency which magnetism has exerted in the formation of the globe.[a]

Having endeavoured to explain the nature and operations of atmospheric fluids, let us proceed to consider the agitations with which this ocean of gases and vapours is affected.

[b] Capt. Parry, in his first voyage, would seem to have passed near the magnetic pole. In lat. 74° 39′ 51″ N. long. 91° 47′ 36″ W. the variation was 128° 58′ W.—in lat. 75° 9′ 23″ N. long. 103° 44′ 37″ W. the variation was 165° 50′ E., the dip 88° 26′; consequently the magnetic pole must have been between these two longitudes, and a little to the south of their latitudes. Capt. Parry concluded that, between 74° and 75°, the magnetic meridian passed through 100° W. long. The magnetic pole has been placed at about 72° N. long. 100° W. The temperature, in the neighbourhood of Melville island, between 74° and 75° N., was colder than should have been by calculation; its mean for one year, Sept. 1819 to Aug. 1820 inclusive, being + 1°.33. This fact, in connexion with the greater coldness of the E. sides of the two continents, has led Dr. Brewster to conclude that the two points of greatest cold are not at the pole, but one of them near the magnetic pole, as above indicated, and the other N. of the N. E. cape of Asia, or in 80° N. lat., and 100° W., and 95° E. long.; consequently their meridians would pass through the E. part of the two continents. The needles were found of little use in this part of Capt. P.'s voyage, being too weak to traverse on ship-board. There were no electrical phenomena. Electricity was not even indicated by the electrometer at mast-head. The aurora borealis was frequent, but faint; nor were the coruscations so rapid as from 60° to 68°. There was no crackling or rustling attending it; nor were the centres of its arches generally in the magnetic meridian. The greatest light seemed rather to cross the meridian from E to W., and to throw out coruscations N. and S.—P.

BOOK XVI.

Continuation of the Theory of Geography. Of the movements peculiar to the Atmosphere, or of Winds.

THE atmosphere experiences agitations which displace its particles in various directions, and which all depend on a single cause, an interruption of its equilibrium, the restoration of which necessarily takes place in conformity with the laws common to all fluids. A change in the temperature of a column of air, the transformation of a portion of the atmospheric gases into water, their congelation, in a word, whatever causes a vacuum, a condensation, an expansion, and consequently destroys the equilibrium subsisting among the different parts of the atmosphere, necessarily produces the rapid displacement of a mass of air, that is to say, a *wind*.[a]

The velocity of winds being the circumstance most palpable to our senses, several arbitrary denominations have resulted from it, the principal of which are as follows :

Gentle	*wind*, (a breeze,) one that traverses	10 feet in a second.
Moderate	—— (an easy gale,)	16
Strong	—— (a stiff gale,)	24
Violent	—— (a squall,)	35
Storm	*Slight*,	43
	Considerable,	49
	Violent,	54
Hurricane	Of the temperate zones,	60
	Of the torrid zone,	120 to 300.

The direction of winds is not designated, like that of marine currents, by the point of the compass to which they tend, but by the point from which they come ; thus, a *northerly wind* is directly contrary to a *northerly current*.

In regard to duration, winds are distinguished as *constant* and *variable ;* in regard to extent, as *general* and *partial*.

Two general and constant movements exist in the atmosphere ; the one prevails in the torrid zone, and carries the air westward in respect of the earth, in a direction conformable to that of the general movement of the ocean ; the other, which is principally felt in the temperate zones, carries the polar air towards the equator, and by this means produces two polar currents or effluxes, similar to those already pointed out in the ocean.

We shall first consider the equatorial movement of the atmosphere ; that which occasions the *trade-winds*, or the constant east wind which blows in the torrid zone. The primary cause of those winds seems to be the expansion which the air undergoes from the action of heat ; for the sun (which we suppose to be situated in the plane of the equator) must evidently, by its heat, rarefy the columns of air beneath it, and raise them above their level, from which they must of necessity either be dissipated in the celestial space, or sinking again by their weight, they flow towards the poles, along the higher parts of the atmosphere. At the same instant, however, a fresh quantity of air must arrive ; proceeding from the polar regions, it comes to replace the air which has been rarefied at the equator. Thus two opposite currents of air will be formed ; one in the higher, another in the lower strata of the atmosphere. But the real velocity impressed on each particle of air, being caused by the earth's rotation, must be smaller the nearer that particle is to the poles ; and hence the circumpolar air, as it advances towards the equator, and preserves for a time its primitive velocity, must revolve more slowly than the corresponding parts of the earth ; bodies situated at the earth's surface will therefore strike against it with their excess of velocity, suffering, from its re-action, a resistance opposed to their rotatory motion ; and to the observer, who imagines himself to be at rest, the air will appear to move in a direction precisely contrary to that of the rotation of the globe, in other words, from east to west.

The different positions of the sun, at different seasons of the year, will produce certain modifications in those atmospheric movements. We shall indicate their general character. When the sun passes to the north, in April, May, and June, the air of our hemisphere is proportionably dilated, from the equator to the pole. It will rise therefore, and the void produced by its rarefaction, in the lower strata, will be filled by a polar current. At this season, accordingly, we shall have a north wind ; but in a certain latitude, suppose 30°, our north wind will encounter the general east wind ; if they meet at right angles, a compound movement will result, and we shall have a north-east wind. On arriving at the summer solstice, the sun will warm every part of the northern hemisphere, more or less considerably ; the heat will continue for a certain period of time ; and hence in July and August we shall have fewer north winds. But our luminary retires ; the polar air is cooled and condensed anew ; the equatorial atmosphere becomes more and more dilated. The general north wind will, therefore, re-appear in September and October. It will go on increasing as the sun recedes from us, and approaches the winter solstice. There will be a limit, at which the condensation of the air north of the equator, and the expansion of the air to the south of it, will cease ; an equilibrium more or less perfect will then reign throughout all the atmosphere.

The same phenomena, in a contrary order, must happen in the southern hemisphere. Over all the globe, therefore, we should find equatorial and polar winds of regular occurrence, if those general movements were not resisted and deflected by an infinite number of causes. Similar variations, we have seen, produce an influence on the currents of the ocean ; and the atmosphere be-

[a] D'Alembert, Recherches sur le cause générale des Vents ; Paris, 1754. De la Coudraye, Théorie des Vents et des Ondes, couronnée à Copenhague, en 1786. Halley, Account of the Trade-Winds and Monsoons, in the Philosophical Transactions, No. 183. Forrest, Treatise on the Monsoons, London, 1783. Dampier, Traité des Vents.

ing incalculably more subtile, and also less homogeneous than water, we cannot wonder that it should be more sensible to the smallest impulse, and more liable to unexpected changes.

The inequalities of the earth's surface, and the diversity of its soils, have, no doubt, a powerful influence on the constitution of the atmosphere. At one place, mountains covered with eternal snow arise, and prevent the air from undergoing the same expansion as in valleys; at another, burning sands, forests, marshes, savannahs, are spread out, and exhale various inflammable gases; at a third, we observe large basins of water surrounded and irregularly indented by land. The air must, therefore, suffer relative and partial condensations and expansions: hence the *sea-breeze*, the *land-breeze*, the *mountain-breeze*. Those changes too will occur differently in summer and in winter, during the day and during the night. Hence the morning and the evening breezes,—those *aurœ matinales*, those zephyrs, whose refreshing breath re-animates us in the warm season.

These alternate breezes are felt at very high latitudes, as, for example, at Bergen in Norway. The South Sea Islands, notwithstanding their small circumference, in this manner, during day-time, attract the general east wind, which is thus made to embrace them, as it were, on every side, and to blow from all points of the compass towards the central summit of the island. When night arrives, the air flows back again from the summit, towards the sea in every direction. This observation of Forster's throws great light on the theory of winds.

In the last place, chains of mountains may arrest winds in the lower regions of the atmosphere, or turn them from their direct path, and sometimes give them more impetuosity, as marine currents acquire greater force in the neighbourhood of straits and promontories. Such violent movements of the air, when arrested by an obstacle, have given particular notoriety to Cape Horn, the Cape of Good Hope, and the South Cape of Van Diemen's Land, to the Strait of Bab-el-Mandel in Arabia, and the Dragon's Mouth[a] in America, not to mention others.

Exhalations from the soil impart their own peculiar qualities to winds. Thus, in Arabia, the *Simoom* carries much nitrous gas along with it; the *Harmattan* of Guinea much oxygen; the *Chamsin* of Egypt much azote.

The positions of the moon may exercise an influence on winds, by producing a sort of ebb and flow in the atmosphere; but we are by no means of opinion, that the immediate agency of the lunar attraction can excite such oscillations. This immediate agency, in so subtile a fluid, must be altogether transient, and, consequently, its effect almost imperceptible. The phenomenon appears rather to be caused by a re-action of the ocean on the atmosphere. Indeed, the movements of the sea must generally have an important influence on those of the air. It is chiefly from the bosom of the sea that the constituent principles of our atmosphere are unfolded; and its parts must, therefore, have a velocity proportionate to that of the aqueous particles from which they have just been disengaged.

Clouds, by intercepting or condensing the sun's rays; common rain, by its cooling effect; vegetation, by absorbing great quantities of air; the decomposition of animal and vegetable substances, may all contribute to the formation of local winds.

Hurricanes appear to have an electric origin. At the moment when the electric spark unites a quantity of oxygen gas with a quantity of hydrogen, to produce a rain-storm, in all probability a considerable mass of hydrogen is consumed, and thus occasions a sudden fall of rain or hail; by which means a very large vacuum is formed, and the ambient air rushes into it with astonishing rapidity, and sometimes in the most opposite directions.

The Antilles, the Isle of France, and the Isle of Reunion,[b] the kingdoms of Siam and China, are the countries in which hurricanes most frequently exercise their ravages. The hurricanes of Europe are not, in any way, to be compared with those of countries farther to the south; generally speaking, the former are nothing more than whirlwinds occasioned by the meeting of two opposite currents. But in a real hurricane, all the elements seem to have combined and armed themselves for the destruction of nature. The lightnings cross each other; the thunder roars without interval; rain falls down in torrents. The velocity of the wind far exceeds that of a cannon ball, or of the powder which impels it; growing corn, vines, sugar canes, forests, and houses, every thing is swept away; one might imagine the ground it had passed over was cleared and levelled. It begins in various ways; sometimes we have one little black cloud appearing on the summit of a mountain; at the instant when it seems to settle on the peak, it rushes down the declivity, unrols itself, dilates and covers the whole horizon; at other times, the tempest advances in the shape of a fire-coloured cloud, showing itself suddenly in a calm and serene sky.[c]

The *water spout* or *syphon*, is a no less dangerous phenomenon. Syphons are distinguished as terrestrial and marine; it were better to divide them into *air syphons* and *water syphons*. The latter usually occur in the manner we are now to describe. Underneath a dense cloud, the sea becomes agitated with violent commotions; the waves dart rapidly towards the centre of the agitated mass of water; on arriving at which, they are dispersed into aqueous vapours, and rise, whirling round in a spiral direction, towards the cloud. This conical ascending column is met by another descending column, from the centre of the cloud, which leans towards the ascending column, and joins it. In many cases the marine column is from 50 to 80 toises[d] in diameter near its base; both columns, however, diminish towards the middle where they unite; so that here they do not extend more than three or four feet in diameter. The entire column presents itself in the shape of a hollow cylinder, or tube of glass empty within. It glides over the sea without any wind being felt; indeed seve

[a] Boca del Drago.
[b] Bourbon.

[c] Voigt, Magasin de Physique, vii. 36—40, (in Germ.) Comp. Encyclopédie Méthodique Marine, tome iii. partie 2d, p. 813, *et sqq.*
[d] 319.79 to 511.66 feet Eng.—P

ral have been seen at once following different directions. When the cloud and the marine base of the water-spout move with unequal velocities, the whole spout is often seen to incline sideways, or even to bend, and finally to burst in pieces. A noise is then heard like that of a cataract falling in a deep valley. Lightning frequently issues from the very bosom of the water-spout, particularly when it breaks; but no thunder is ever heard.[a]

Philosophers explain this phenomenon in the following manner: Two winds meet; a vortex ensues; any cloud which happens to lie between them is condensed into a conical form, and turned round with great velocity. This rotation impresses all the particles of the cloud with a centrifugal force; they are driven towards the exterior surface; a vacuum is produced within, about the axis of the cone; water or any other body lying beneath this vacuum, is carried into it by the effect of gravity striving to re-establish an equilibrium.

Having considered the general and the modifying causes of winds, let us now trace, with greater minuteness, such of those atmospherical movements as, by their regularity and extensive occurrence, are most important to geography.

In the Atlantic Ocean, the general east or trade-wind prevails up to the 32d or the 28th degree of north latitude, according as the sun is in this or the other hemisphere. On the north-east coasts of America, the trade-winds extend as far as 40 degrees; a fact evidently showing that currents in the atmosphere, like currents in the ocean, grow broader as they proceed: while, on the other hand, the east winds, like the westerly movement of the ocean, do not begin to produce a vigorous effect, till they have reached a certain distance from the eastern continent, their point of departure. The same peculiarity occurs in the Ethiopian Ocean, where the east wind extends, in like manner, some degrees farther on the coast of Brazil, than near the Cape of Good Hope. As those east winds always receive the impulse of the two polar atmospheric currents, at an angle approaching more or less to a right angle, they change into *north-east* in the northern hemisphere, and *south-east* in the southern hemisphere. But on approaching the coasts of America, the general east wind resumes its force, overcomes the effect of the polar currents, and follows its own direction from east to west, with more or less exactness.

On the coast of Guinea, particularly from Sierra Leone to the Isle of St. Stephen, south and south-west winds prevail over an extent of 500 leagues of shore. They turn more to the south-west and west, as we approach the land. If to this circumstance be added the fact, that, in Guinea, there sometimes occurs an east wind of extreme violence, it appears natural to regard those two movements as having a direct connexion; and the south and south-west winds will thus be nothing more than partial currents of the general trade-wind, attracted to the vast continent of Africa, where the air is prodigiously rarefied by means of the solar rays reflected from its burning sands. But as the general trade-wind must, notwithstanding, sometimes produce its effect in the interior of that continent, those great masses of air, accumulated and condensed on the central platform of Africa, will now and then make violent eruptions.[b]

On the confines of the two trade-winds, in the western ocean, between the 4th and 10th degrees of north latitude, and the 330th and 365th[c] of longitude (from Ferro,) there is a space of sea where navigators find perpetual calms, accompanied by a suffocating heat, by thunder-storms and dreadful lightning, with rains so frequent and so copious, that this tract has been called the *rainy sea*. The slight winds that occur here are but sudden squalls, of short duration and little extent; so that sometimes every hour affords a different wind, which degenerates into a calm before another succeeds it.

Calms prevail equally about the common limits of the trade-winds and variable winds; but, in these cases, they are soon destroyed by blasts and *tornadoes*.

It is from observing this habitual condition of the atmosphere, that fixed methods have been laid down for sailing to and from the continent of America. In the first case, a navigator always endeavours to get southward to a latitude near the tropic, because in that quarter he is sure of finding a fresh easterly or north-easterly wind, which, joined to the prevailing current, will rapidly drive him towards the American coast. For returning to Europe, he endeavours to reach at least the 30th degree of latitude; because it is there that the winds first become variable, though more frequently they blow from the south-west.

In the *Great Ocean*, or Pacific Sea, we again find the general movement of the atmosphere from east to west, modified by the two polar currents. The vast extent of this sea allows the atmosphere to unfold its natural movements in a regular manner. The north-east and the south-east winds are here so steady and strong, that, if at Panama, in place of an isthmus, there were a strait, the voyage to China would be accomplished much sooner by sailing westward than by sailing eastward. As these movements set out from America and the Andes mountain-chain, they are more feeble and circumscribed on the coast of America, where they do not begin till near or even within the tropics. On the opposite coasts of Asia and the regions to the south, they extend as far as the fortieth parallel. In sailing from Acapulco to the Philippines, the Spaniards simply allow themselves to be carried forward by the winds and currents, which drive them in a straight line, and very speedily, to their place of destination; and this is the reason why, though navigating that ocean so long, they have discovered so very few of those southern regions, from which they were frequently at no great distance. In returning to Mexico, they ascend as far as Japan, and then direct their course to the north-west coast of California. This great extent of the trade-winds must be attributed to the weakness of the northern polar currents, aërial as well as marine; while it is the superior strength of the south polar currents which causes south winds to prevail along the coast of Peru.

It is in the Indian Ocean alone that the famous *mon-*

[a] Voyages of Dampier, Thévenot, Le Gentil, &c. Encyclopédie Méthod. Marine, tome iii. partie 2d, p. 791. Forster, Observations on Physical Geography, p. 93, (in Germ.)

[b] The Harmattan, a violent and very dry wind, accompanied by a reddish haze, blows from the interior along the coast of Guinea, probably from the deserts.—P.

[c] Between 12° and 37° W. from Greenwich.—P.

soons, or half yearly winds, seem to destroy the uniformity of the general atmospheric movement. No doubt, however, they might be made to accord with it, provided we knew all the circumstances which influence them. We exhibit the facts in the first place. From the 10th degree of south latitude to the tropic of Capricorn, and beyond it, the general east or south-east trade-wind prevails over all the Indian Ocean, sometimes in summer extending as far as the 2d and 3d degrees of south latitude. On this side the 10th degree, we first meet with the *monsoons*[a] or periodical half yearly winds. North of the equator, from April to October, a violent *south-west* wind prevails, accompanied with tempests, storms, and rain; while a soft and pleasant *north-east* wind blows during the other six months. Between the second and twelfth parallels of south latitude, the winds blow generally from *north-west* during the six winter months, from *south-west* in summer.[b]

During winter, then, the constitution of the atmosphere exhibits the following principal circumstances: North-east winds north of the line; north-west winds south of it, to the 10th parallel; and finally, the east and south-east trade-winds. In *summer*, the phenomena are less contradictory: South-west winds from the 10th parallel to the northern limits; trade-winds south of the 10th parallel.

These general tendencies are subject to variations, depending on the figure and elevation of coasts, on straits, and currents of the sea. The north-west and south-west monsoons are weaker and more variable in the Bay of Bengal, more steady and violent in the gulf of Arabia. Both those monsoons grow broader to the west, ranging in this direction over the whole tract of sea that lies between Africa and Madagascar. In the seas extending between China, the kingdom of Siam, Sumatra, and the equator, those monsoons are felt likewise; but here, excepting local variations, they are almost entirely *north* and *south*. They extend as far as the Philippine Islands, and though with much inconstancy, even to Japan. Between the equator, the island of Java, and New Guinea, the monsoons are nearly similar to those of the Chinese Sea, in regard to their direction, which merely varies a little to the north-west in the north monsoon, and a little to the south-west in the south monsoon. But they do not begin till six weeks after those of the Chinese Seas.

Some other striking circumstances still remain to be noticed. The monsoons do not change, or, as sailors express it, do not break, of a sudden. Their change, which usually takes place fifteen days or four weeks *after the equinoxes*, is announced by the decay of the existing monsoon, by calms and squalls in rapid succession, by storms, water-spouts, tornadoes, and by Indian hurricanes, called *taifouns*, particularly terrible from the explosions of electric matter accumulated by the monsoon. The beginnings of the subsequent monsoon are, at first, liable to variations, till finally it establishes an absolute dominion.

Navigators assert, that, on quitting the region where a monsoon prevails, one is sure, in ordinary circumstances, to fall in with a very strong and impetuous wind, blowing from a quarter directly opposite. They must naturally have observed this phenomenon with much care, since the calms and whirlwinds it occasions are productive of great danger. It can hardly be explained, except by admitting, with Halley, the existence of two currents,—one above, composed of warm and rarified air; another below, composed of the column of cold and condensed air. This hypothesis will become almost a settled truth, if we observe how small is the elevation to which the monsoon extends—a fact clearly exhibited in the peninsula on this side the Ganges, where the monsoons are arrested for several months by the mountain chain of the Gauts, (not certainly of extraordinary height;) so that the coast of Coromandel, and that of Malabar, have always their dry and their rainy seasons, at opposite periods of the year.

According to the preceding description, it is the *south-west monsoon* alone which presents any phenomena directly contrary to the general movement of the atmosphere; for the north-east monsoon is in conformity with it, and the north-west wind south of the line seems not to be altogether constant, and may perhaps arise from nothing more than a compound movement, or a higher current of air.[c] What then is the origin of this half-yearly wind, which in summer blows from south and south-west, over all the Indian ocean? The sagacity of physical geographers[d] has long been exercised by this question. We give the explanation of which Halley laid the ground-work, and which appears to us the most plausible.

The monsoons always change some time after the equinoxes; they constantly blow towards that hemisphere in which the sun is found. The action of this luminary on the atmosphere, is, therefore, plainly one of their causes. When its rays, reflected from the mountains of Thibet, scorching the plains of Bengal, and the valleys of the kingdom of Siam, rarefy and dissipate the atmosphere, the cold air becomes violently attacted from the regions about the south pole. The sun's action is seconded by the marine current, which proceeds from the southern polar seas to those of India. This current must bring with it a column of vapours, continually disengaging themselves from its surface. The absence of a northern marine current must farther be added; we can even imagine, that the mountains of Thibet, and the whole central platform of Asia, may arrest and preserve the cold air, which would otherwise proceed from Siberia towards India.

But why does not this polar wind prevail south of the equator also? For the same reason which renders the aquatic polar current inconsiderable there. The general movement of the ocean being here opposed by no obstacle, has too much force to be modified by the polar current. A similar result happens in the atmosphere, at all times intimately connected with the ocean, which feeds and modifies it. But on leaving New Holland between us and the Pacific Ocean, the general movement

[a] From a Malay word, *moussin*, signifying *season*.

[b] Moore's Practical Navigation, 12th edit. London, 1796, p. 124, *et seq.*

[c] May not this north-west wind be owing to the position of the high mountains of S. Arabia and Abyssinia, in that direction from the Indian ocean?—P.

[d] Deluc, Modifications de l'Atmosphère, No. 730. Muschenbroek, Essai de Physique, ii. 879.

of the Indian sea must evidently be more and more abandoned to its individual force, and that force must soon be overcome by the polar current, which, after being long deflected or concealed by the general movement of the ocean, now re-appears in all its energy. The polar column of water now fills the atmosphere with cold particles, which, by their gravity, determine the whole atmospheric mass to flow towards the equator, more strongly and more directly than it would have flowed otherwise. It is possible, moreover, that higher currents may exist in the atmosphere, and descend towards the earth at the time when the monsoons commence.[a]

On the west side, the mountains of Lupata in Africa, and those of Madagascar, may, or rather must concur in furnishing their cloudy and stormy air to the south-west monsoon, which, from this circumstance, begins here, in the channel of Mozambique. It is possible that mountains in the interior of New Holland may exert a similar influence on the east side.

When the sun has passed into the southern hemisphere, the monsoon alters its direction; the mass of air which had been accumulated during summer on the central platform of Asia, now bestirs itself, and moves towards the regions south of the equator, where the atmosphere has been dilated and dissipated by the solar heat. Over most part of the Indian ocean, this monsoon proceeds from the north-east, because the central platform lies to the north-east. On the other hand, as the seas of China, of Borneo, of New Guinea, of Java, have the centre of Asia to the north and north-west, the monsoon comes to them from those points. It arrives there in a slow progression, in consequence of the many islands whose elevated summits arrest and turn it aside. The north-east monsoon is mild and agreeable, because the mass of air, condensed on the central platform of Asia during summer, having originally passed through the torrid zone, and afterwards remained exposed to the sun's action about the time of the solstice, it has thereby lost the cold and the cloudiness which otherwise it might have acquired from contact with the Siberian atmosphere. It seems possible that this north-east monsoon may fall in with a remnant of the preceding monsoon, about the second or third degree of south latitude; a remnant, which is perhaps maintained in existence by the mountains of Africa, Madagascar, and New Holland, since the cold air of those mountains is not solicited to flow towards the south pole, and has no outlet but towards the equator. From this direct rencounter of the old and the new monsoon, a compound movement would result, which might produce those north-west winds so common between the equator and the tenth southern parallel, during the whole continuance of the north-east monsoon.

Both monsoons are more powerful in the Arabian Gulf, because this confined and shallow piece of water has no currents in it but such as are superficial, and therefore unable to resist the action of the winds.

All the irregularities displayed by winds pertaining to a place or a region of the globe, are thus nothing more than combined effects resulting from the general atmospheric currents, from partial interruptions of them, from the sun's apparent motion, and the arrangement of mountains.

The reader who has followed us through these arid but indispensable details, may perhaps desire that we should recompense him by portraying the useful or agreeable effects, of which the winds, whose paths we have just been tracing, are productive. Shall we stop to repeat observations so familiar? The winds, it is well known, purify our atmosphere, by keeping up a perpetual agitation in it; they dissipate the miasmata exhaled from marshes and stagnant water; they raise and transport the clouds destined to fertilize the ground by means of rain. Millions of seeds, furnished with their little pinions, ride upon the wings of the wind, and spread afar the empire of vegetation. The ingenuity of man has made a lever of the winds, which, when applied to machinery, spares him an immensity of toil. If the ocean is the highway of our globe, winds are the indefatigable coursers which rapidly transport our ships from pole to pole. Considering winds merely in a picturesque point of view, how many enjoyments do they procure to a lover of the great spectacle of nature—above all, to the inhabitant of mountains! Sometimes they spread over every valley a curtain of clouds, which shows the summits of the far distant Alps like so many islands scattered on the surface of an ocean; sometimes partially drawing this curtain aside, they open to us all at once the most astonishing prospects, in which the brightest sunshine forms a happy contrast with the contiguous shades. It is to storms of wind, that the painter and the traveller are indebted for the most extraordinary scenes which can meet their view. In the evenings of summer, and still more of autumn, it is the winds which, accumulating and marshalling their long trains of clouds, create and destroy before us those fugitive landscapes, those aërial mountains, which are tinged by the fires of the setting sun.

The atmosphere undergoes various other modifications in respect of its local temperature, or of *physical climate*. They will form the subject of our next book.

[a] This opinion that there are higher and counter currents in the atmosphere, has been applied to explain the sudden irruption of storms, after the winds have been long blowing in an opposite direction. In this case the higher current is supposed to descend suddenly and cause the storm.—P.

BOOK XVII.

Continuation of the Theory of Geography. Of the Local Temperature of the Atmosphere, or of Physical Climates.

In no department of geography have authority and preconceived opinions been permitted to prevail more generally than in that which treats of the causes of physical climates. The sun was long considered as the only source of those varieties of temperature which we experience in the different regions of the earth. The influence ascribed to winds was determined only according to some local observations which had been made by Hippocrates in Greece, or in the neighbouring countries. That this branch of physics may be thoroughly investigated, it is requisite for civilized nations not only to despatch travellers to the neighbourhood of the poles and the equator, but also to form permanent establishments in these quarters of the globe. It is by uniting together and arranging, under general points of view, the results of particular local observations, that we shall endeavour to trace a sketch of *climatology*, in some measure corresponding to the present state of the other sciences.

Physical climate comprehends the degree of heat and cold, the drought, the humidity, and the salubrity, which occur in any given region of the earth.

The causes of physical climate are *nine* in number: 1*st*, The action of the sun upon the atmosphere. 2*d*, The interior temperature of the globe. 3*d*, The elevation of the surface above the level of the ocean. 4*th*, The general inclination of the surface, and its local exposure. 5*th*, The position of its mountains relatively to the cardinal points. 6*th*, The neighbourhood of great seas, and their relative situation. 7*th*, The geological nature of the soil. 8*th*, The degree of cultivation and of population at which a country has arrived. 9*th*, The prevalent winds.

The air does not appear to acquire immediately, by the passage of the solar rays, a considerable degree of heat. This is proved by the successive coldness of the different strata of air, which is observed upon all mountains.[a]

The distinction between *sensible heat*[b] which warms the particles, and *latent heat*, which only dilates them,[c] makes us imagine that the superior air, more disengaged from vapours, and less compressed, must allow the calorific rays to pass more freely; and that, on the contrary, the more the air is condensed, the more will the rays be stopped in their course, and repelled, and reflected in various directions; the shock of the two fluids will thus be more forcible; and it is probably a similar shock that causes a disengagement of latent caloric, which is the principal cause of the sensible heat of our atmosphere.

But what chiefly contributes to warm the lower regions of the air, is the reflection of the rays which strike against the ground, and which, thrown back again towards the atmosphere, stop in the inferior part of it, and are confined in the midst of the watery vapours with which it is loaded. This reflection necessarily accumulates the heat in the regions nearest to the surface of the earth. We cannot here explain the theory of caloric considered as a radiant body, a theory which has been recently developed;[d] but it is sufficient for our purpose to observe the extraordinary degree of heat which often exists between two declivities of the same mountain, whilst the neighbouring plain is but moderately warmed.

The degree of immediate solar heat is determined by four causes.[e] The first is the distance of the sun from the earth. If we take the mean distance equal to 10,000, the distance at the summer solstice is equal to 10,166, and at the winter solstice to 9833; the proportion is nearly as 30 to 29. The quantity of rays falling upon the same plane, being inversely as the squares of the distances, their proportion will be as 841 to 900, or as 1 to $1\frac{1}{14}$. Thus the quantity of solar rays which the globe receives in winter is greater than that which it receives in summer. The second cause which we have to consider is the direction more or less oblique, in which the rays strike the earth, and which depends upon the height of the sun in the ecliptic. The more directly the rays fall the more force they have, and, at the same time, the greater is the number falling upon a given space. Fatio, in considering the perpendicularity of the rays, which gives them a great force, computes, that, independently of all other causes, the heat of summer should be to that of winter as 9 to 1. But these calculations suppose the surface of the earth to be exactly spherical, without the least local declivity. The third circumstance to consider is the length of the day, or the length of that semi-diurnal arc which the sun describes. The continuity augments the effect, and the short nights allow only a small quantity of the acquired heat to evaporate. The fourth and last cause, which modifies the solar heat, is the refraction which the rays experience in passing more or less through the different strata of the atmosphere. Bouguer has calculated, that, taking 10,000 rays, 8123 of them arrive at a given point, if they come perpendicularly, 7624, if the angle of direction is 50 degrees, 2031 if it is seven degrees, and only 5 if the direction is horizontal.

The solar heat, distributed according to these four principles, would be entirely different from that which we actually experience. We should have in the summer solstice under the line, 20 degrees of Reaumur's thermometer; at Paris, 36; under the polar circle, 68; and under the 74th parallel of latitude, we should find the terrible heat of 80 degrees of Reaumur. It would

[a] Deluc, Modifications de l'Atmosphère, ii. § 797, *sqq.*
[b] "*Calorique libre*," free caloric.—P.
[c] Laplace et Lavoisier, Mémoire sur le Calorique latent, dans les Mémoires de l'Academie des Sciences, 1780, p. 388.
[d] Prevost, Théorie du calorique rayonnant, Genève 1809.
[e] Mairan, Mém. de l'Academie des Sciences, 1719 et 1765. Bouguer, sur la Gradation de la Lumière. Bergmann, Géog. Physique, § 140.

hen diminish towards the poles. In the winter solstice, the cold would be equally distributed in a manner perfectly contrary to experience. We are therefore certain that the direct and immediate action of the rays of the sun does not of itself determine physical climates.

Some persons have sought for the cause of climates in the *internal heat* of the globe, which generally appears to be about 10 degrees of Reaumur above zero.

This heat is not the effect of a central fire. Such a fire might, without doubt, exist in the bosom of the globe, as there are cavities filled with air, but it would act more powerfully, and with greater uniformity. The beneficial influence of it would be felt towards the poles, as well as under the equator. All the deep springs would be hot. Romé de l'Isle, in his work upon the heat of the globe, has refuted all the false reasonings by which Buffon and Bailly had deceived themselves. We shall form a juster conception of the internal temperature of the globe, if we regard it as the result of the different degrees of heat which it may have acquired from the successive action of the sun, and which are accumulating in the course of ages, as far as the density of the globe admits of it, and the force of the solar rays is adequate to the production of such an effect. The globe having once acquired this depth of heat, which is uniformly diffused through all its parts, the variable temperature of our summers and winters can no longer produce a change in its interior. But if we supposed some local fermentations in the interior, these might influence and modify the external temperature. It is possible, too, that some kinds of soils transmit with more facility than others, the internal heat. Finally, observations having shown that the internal temperature of lakes and of seas is much below that of continents, the inference is, that in summer, the atmosphere, which is in contact with these masses of water, must always be less heated than that portion of it which is contiguous to the earth.[a]

With the elevation of the land, cold increases in a very rapid progression. It is superfluous to produce examples of this. Who does not know that winter continues to reign on the Alps and the Pyrennees, while the flowers of spring are covering the plains of northern France? This beneficent appointment of nature, considerably increases the number of habitable countries in the torrid zone. It is probable, that at the back of the flat burning coasts of Guinea, there exist in the centre of Africa, countries which enjoy a delightful temperature;[b] as we see the vernal valley of Quito, situate under the same latitude with those destructive coasts of French Guyana, where the humid heat constantly cherishes the seeds of disease. On the other hand, it is the continued elevation of the ground, which, in the central part of Asia, extends the cold regions to the 35th parallel of latitude, so that in ascending from Bengal to Thibet, we imagine ourselves in a few days transported from the equator to the pole.

The general *aspect* should be distinguished from the local aspect. The west of France, for example, has a general western aspect; and notwithstanding this, the valley of Allier is exposed to the north; that of Mayenne to the south; that of Ouest in Brittany to the south-east. Thus, the general declivity of a country, large in itself, does not exclude the most opposite local declivities. It may, however, be admitted as a general principle, that the positive sum of all the local aspects is in the same direction as the general aspect. This principle can be applied only to spaces of great extent; for example, the entire tract of country through which a river flows.

Every one knows of what effect, as to temperature, is the exposure of a soil relatively to the sun. A hill, inclined 45 degrees towards the south, when the sun is elevated 45 degrees, receives the solar rays perpendicularly, whilst upon a plain, the same rays strike the soil under an angle of 45 degrees, that is, with one quarter less of force; and a hill inclined 45 degrees to the north, will be struck by the solar rays in a horizontal direction, which makes them glide along its surface. If the ground is still more inclined to the north, it will receive no rays, and will remain always in the shade. These differences, which are easily perceptible in hilly countries, are extreme in regions covered with high mountains. It is thus, that in the Valais, we see the Alps on one side covered with eternal ice, whilst vineyards and orchards adorn the opposite hills with all the charms of fertility.

There is still another circumstance to be observed. The angle of incidence of the rays of the sun is determined for any given moment of the day, by the exposure of the land, but it varies also with the diurnal course of the sun. The hill, which in the morning received the solar rays under a direct angle, receives them more obliquely at noon, and perhaps the rays in the afternoon will merely glide over the surface of the ground. The case is precisely the reverse with hills exposed to the west. This is attended with some very remarkable consequences, which we are about to explain.

Every *western exposure* (from south-west to north-west) ought to be warmer than the corresponding eastern exposure, all other things being equal—for the rays of the morning, which directly strike the hills exposed to the east, have to counteract the cold which has accumulated there during the night. When the atmosphere in the afternoon, shall have reached its greatest degree of warmth, the solar rays will no longer serve to concentrate this mass of heat upon soils lying towards the east; for they will fall only obliquely. On the contrary, those hills which incline towards the west, have been already provided with heat during the whole morning; and as soon as the solar rays strike them in a direct manner, they collect and concentrate all the caloric of the atmosphere, without encountering any obstacle. Every thing, on the contrary, will concur in promoting their action.

Without stopping to give more detailed explanations, we shall only remark, that according to this principle, *south-south-west* and *south-west* situations are the warmest of all; whilst, on the contrary, those of the *north-east* are the coldest. It is scarcely necessary to observe,

[a] See the authors quoted by Delamétherie, Théorie de la Terre, iii. sect. 755, 756, &c. &c.

[b] This has been ascertained by the late journeys of Capt. Clapperton in Soudan. In his first journey, the night was so cold, in one instance, as to freeze water; and in his last, he writes from the mountains of Kong, that he found the temperature healthy and agreeable.—P.

that we speak here only of the *Northern Hemisphere*, and that we leave out of view all local and temporary circumstances.

As a moderate degree of cold is favourable to health, and as, under the latitude of Greece, any degree of cold to which they were ordinarily exposed, may rather be looked upon as refreshing than disagreeable, it is clear that Hippocrates was right in recommending eastern situations with regard to salubrity.[a] But is it not contrary to good sense to apply the same principle to climates much nearer the Pole, where the cold is regarded with apprehension, and where the heat, generally more moderate, brings with it none of those epidemic maladies of which Hippocrates speaks? There are so many circumstances which combine to render a climate salubrious or unhealthy, pleasant or inhospitable, that the attempt would be extremely injudicious to characterize climates *solely* according to general or local exposures.

If we consider exposures only by themselves, and without reference to other circumstances, we may, with Hippocrates, compare the eastern one to Spring, those of the south to Summer, those of the west to Autumn, and those of the north to Winter—for although it is true that the constitution most common to climates under these exposures answers to that of the seasons with which we compare them, yet a more exact and more intelligible comparison would be one with the different *divisions of the day*. The most severe cold is felt early in the morning; this division corresponds to the north-east exposure, which is the coldest. The heat augments until three in the afternoon. In like manner, exposures become always more favourable to heat, till we come to the south-west. Evening and midnight follow, corresponding to western and northern exposures.

In considering the climates peculiar to each country, in the general observations of this work,[b] we shall see these subsequent volumes confirmed by a great number of examples.

The *position of mountains* is not always essentially connected with declivities of ground, since there are some mountainous plateaux or upland plains, which (at least as to a portion of their extent) have no general declivity, as in Mongolia, and Thibet—and since, on the other hand, we find countries which incline on several sides, without their most elevated parts being furnished with real mountains, as, for example, the centre of European Russia.

Mountains act upon climates in two ways—they attract the vapours suspended in the air; these vapours, by their condensation, produce clouds and fogs, which generally conceal the summits from our view. Often, also, these assemblages of watery substances, which the winds waft in every direction, are stopped in their devious course by chains of mountains, in the elevated valleys of which, they continue to accumulate. These effects are still more sensibly felt, when a chain of mountains is crowned with extensive forests. They add to the elevation of the mountain, they block up its passages, and they furnish, above all, inexhaustible nourishment to the running waters. The destruction of forests may sometimes prove a blessing to a country, by procuring a freer circulation of air—but, carried too far, it becomes a scourge which may desolate whole regions. We have a sad example of this in the Cape de Verde islands, not to mention others of a less striking character. It is the destruction of the forests, and not a supposed *cooling of the globe*, which has rendered the southern part of Iceland more accessible to the dreadful cold which is too often produced by those masses of floating ice which are intercepted and detained by its northern coasts. Although mountains cannot prevent the general motions of the atmosphere from taking place, they may, however, by stopping them in part, render particular winds more or less frequent throughout a certain extent of country. There cannot be a doubt that the Alps do contribute in securing to Italy its delightful and happy climate, its perpetual spring, and its double harvests.

Examples of climates, rendered colder by the position of mountains, are frequent enough. If central and southern Russia are exposed to colds disproportionate to their latitude, and to their exposure, which is in a great measure southern, it is owing, among other causes, to the want of a chain of mountains to the north, which might weaken the action of the chilling icy winds that blow from the White Sea and the Uralian mountains. Siberia is in a different, and still more unfavourable predicament. It slopes to the north, and consequently lies open to winds from the Frozen Sea; at the same time, its great inclination is, on the south side, crowned by the Altai mountains, which, while they hinder the cold winds from getting vent, and passing farther away, intercept also the warm breezes of Southern Asia.

The shelter from winds which is afforded by mountains, may sometimes become hurtful from excess. Thus we find the heat prove insupportable in those valleys, which in summer concentrate and strongly reflect the rays of the sun. When valleys are extensive and open, when they present a considerable declivity for the flowing of water, and afford free access to winds from the north, the temperature may then be dry and cold, as in the Champsaur[c] described by Villar. The inhabitants of such places will have good complexions, and enjoy a sound state of health.

In valleys which are low, narrow, and hollow, and which receive dry winds only very obliquely, torrents of water and the rains find no vent, the surface becomes marshy, the air does not circulate, and dampness and fogs perpetually prevail. It is in such places that we meet with feeble, indolent, and stupid beings, called *cretins:* they become deaf, dumb, and almost blind; they remain insensible to all impressions, except sensual appetites; if we strike them, they testify no sensation; and they appear to be excited by no wants. Their dangling arms, their gaping mouths, their looks swollen and pendant, their cadaverous colour, indicate the lowest state of human degradation, and of animal degeneracy. The chilling damp which constantly broods over these countries, except when it is exchanged for the warm and equally relaxing vapours of summer, may be regarded as the true cause of the goitre and of *Cretin-*

[a] Hippocrate, Traité des Airs, des Eaux, et des Lieux.
[b] This refers to the original edition.
[c] A valley in Dauphiny.—P.

ism. These maladies bear a great analogy, in their cause and principal effects, to the swellings, the articular tumours, and the imbecility of the effeminate Scythians mentioned by Hippocrates. Fodéré, who purposely visited the valley of Aosta and Maurienne, where cases of goitres and mental imbecility chiefly occur, remarks, that they appear only in the centre of the valleys of the Alps, and that even there they are confined to the narrowest part of the valley, which ceases to produce them as it widens towards the summit of the mountains, where a brisker and drier air prevails, in which the inhabitants enjoy health.

These maladies are to be found in the Lower Valais, at the base of the Pyrenees and Apennines, and in some of the valleys of Dauphiny and Upper Provence. The sallow inhabitants, which we see in several humid districts of America, the white Negroes of the Ethiopian and Madagascar mountains, and the piebald Negroes, appear all of them to be a species of cretins in a greater or less state of degeneracy. Zimmerman attributes to the suffocating heats, which are felt in certain deep valleys of Switzerland, the instances of madness which are so common in these places; and he states, that the inhabitants of these defiles are obliged, during summer, to send away their children to the neighbouring mountains, for the preservation of their memory and reason.[a]

The neighbourhood of the sea moderates the excess of temperature. In hot climates, the maritime regions are not so warm as the centre of the plains. In high latitudes, the coasts and the islands are less cold than the interior of the continents. In the mountains of Norway, so intense is the cold, that it once proved fatal to a Swedish army; the dead bodies were found lying rank and file; at the same time, the coasts of the country enjoy a very mild climate. The port of Bergen does not freeze so often as the Seine. Laurels, fig-trees, myrtles, and pomegranates, which cannot live without shelter in the centre of France, grow naturally in abundance at Brest.[b] The temperatures of the different seasons also approach nearer each other in the neighbourhood of the sea. At Plymouth, although the mean heat of the year is, on the whole, a little less than that of Paris, the winter months are much less cold. The thermometer never sunk lower in the time of Huxham than ten below zero, nor rose higher than +21.2 on the scale of Reaumur.

The intrinsic nature of the soil must have an influence on climate in a variety of ways. All grounds are not heated equally soon. One soil quickly parts with its acquired heat, while another retains it for a long time. Exhalations, which vary according to the nature of the soil, rise into the atmosphere, and become identified with it. Clayey grounds, and those which are impregnated with salt, cool the atmosphere; heaps of sand, when they are dry, augment the heat. It is supposed, for example, that the severe cold, and the unwholesome air, which prevail in the governments of Astracan and Orenburg, partly arise from the saline nature of the soil; while several provinces in France owe in part their dry and salubrious temperature to this, that their soil is sandy, calcareous, and in general light. Ground which is stony and barren, emits fewest vapours. The contrary may be said of marshy soils; grounds of this description, and even sands impregnated with moisture, diminish the heat; and as the waters there are for the most part stagnant, the duration of the frosts is prolonged without bringing in return a sky serene and unobscured by noxious fogs. This is the reason why the winter in Holland, under 52 degrees of latitude, is often more disagreeable than that of the Danish islands under the 55th parallel.

The effect of marshes, in hot countries, is still more fatal, for they ferment and evolve a great quantity of putrid effluvia; it is to these that the eastern coasts of Africa,[c] and some parts of America, owe their pestilential climate.[d]

In every country, the sky has a different aspect. The azure arch, which, by an optical illusion, on every side limits our view, seems to be lower in England than it is in France. In vain does the Italian, upon the borders of the Seine, look for that pure, serene, and boundless sky, that atmosphere of clear blue, or of vivid red, which so much contributed to inspire a Raphael and Correggio. But even the Italian sky is cloudy, in comparison of that which, in summer, canopies the blissful islands of the Pacific Ocean, that paradise of the torrid zone. It is to the different degrees of the rarefaction of the air, as well as the nature of terrestrial exhalations, that we must attribute these different appearances of the sky, on which the beauty of a climate partly depends.

Man exercises a slow but powerful influence upon the temperature of the air. Without cultivation, few climates would be salubrious and agreeable. Let us contemplate a desert country; the rivers, abandoned to themselves, become choked, and overflow; and their waters serve only to form pestilential marshes. A labyrinth of thickets and of brambles overspreads the most fertile hills. In the meadows, the unsightly mushroom, and the useless moss, choke the nutritious herbs; forests become impenetrable to the rays of the sun; no wind disperses the putrid exhalations of the trees which have fallen under the pressure of age; the soil, excluded from the genial and purifying warmth of the air, exhales nothing but poisons; and an atmosphere of death gathers over the whole country. But what do not industry and perseverance accomplish? The marshes are drained; the rivers flow in their disencumbered channels; the axe and the fire clear away the forests; the earth, furrowed by the plough, is opened to the rays of the sun and the influence of the wind; the air, the soil, and the waters, acquire by degrees a character of salubrity; and vanquished nature yields its empire to man, who thus creates a country for himself.

The cultivation, however, of a new country, is often attended by most disastrous consequences, which ought not always to be imputed to the improvidence of colonists. The new soil, the moment that it is broken up by the plough, and penetrated by the rays of the sun, must necessarily undergo a strong evaporation, and its exhalations, which are not always of a harmless kind,

[a] See the articles Switzerland, Carinthia, &c. in this work. See the article France.

[b] The western coasts of Africa, from the Senegal to Congo, are among the most unhealthy on the globe, particularly about the Bight of Benin. The yellow fever has been referred to this source.—P.

[c] See the description of Africa.

scarcely elevated in the air, are condensed by the cold, which still continues to be sharp, particularly during the night. Hence arise those epidemic maladies which ravage colonies newly established. The destruction of forests, especially when carried too far, is followed by pernicious effects. In the Cape de Verde Islands, it is the burning of the forests which has dried up the springs, and rendered the atmosphere sultry.[a] Persia, Italy, Greece, and many other countries, have thus been deprived of their delightful temperature. The cutting down of the forests which once covered the Pyrenees, has rendered the air very unwholesome in the valley of Azun, in the department of the Eastern Pyrenees, because the absence of that barrier now permits a free passage to the southern winds. Similar complaints are made in Castile and Arragon.

The *predominant winds* of every country variously modify the united influence of all the elements which constitute physical climate, and which we have just been considering. But the nature, the direction, and the intensity of the winds, depend upon general and local exposure, the neighbourhood of seas, the elevation of mountains, and other circumstances. Thus the causes of climate form together a circle of which we can point out neither the first link nor the last. We ought not to characterize the physical nature of winds in a general manner, according to the points of the compass from which they blow. Hippocrates made use of this method, but confined his observations to a small part of the globe. But we should only injure the reputation of this great man by attempting to apply his local maxims as general rules.

All the variations of the winds depend upon the equilibrium of the atmosphere. Hence it follows, that the heat of one climate, and the cold of another, exercise a continual influence upon each other. The northern parts of a great continent will sometimes send forth their cold air towards the southern parts; and sometimes they will receive warm air in return. The great facility with which the atmosphere is put in motion, does not permit us to limit these facts to particular places: the whole of the heat and cold which surrounds the globe, is in a state of constant and universal flux and reflux. We may, therefore, lay down the following principles. The heat of the torrid zone, and the polar cold, balance each other; and upon the fluctuation of their equilibrium depend the variations of heat and cold, which are felt in the temperate zones. All winds, in the temperate zone, coming from the neighbouring pole, are cold; and all winds from the equator are hot, with some exceptions occasioned by local circumstances. Thus the southern wind cools and refreshes the environs of the Cape of Good Hope, whilst the northern wind has the same effect upon Europe. A land wind, if it passes over plains very elevated and open, is almost always cold and dry in the temperate zones. But between the tropics, if it blows over plains little elevated, and covered with burning sands, it must be dry and warm. The winds which arise on mountains, are not more conformable to any general rule; for there are some mountains covered with ice, whilst upon others there prevails a remarkable dampness: the winds from these, therefore, will possess different properties. As to winds from the sea, they are, almost without exception, damp, and charged with fogs and saline vapours; and as the air they bring with them is always either hotter or colder than the air upon the land, they constantly occasion that kind of decomposition of atmospheric vapours, which produces rain. It follows, then, that every country of the temperate zone which is separated from the equator only by a great extent of contiguous land, has necessarily the air more habitually hot, than that country which has vast seas flowing between it and the torrid zone. On the contrary, the countries of the temperate zones, which have extensive tracts of land between them and the neighbouring pole, and which are separated from the equator by seas, will have a climate habitually colder than other countries under the same latitude, but under another combination of local circumstances.

If we apply these different principles to the northern part of the old continent, we shall see that the enormous diminution of heat which we observe as we advance towards the East, under the same latitudes, is in a great measure owing to the form and position of that mass of earth. The western part derives warmth from being in the neighbourhood of Africa, which, like an immense furnace, distributes its heat to Arabia, to Turkey in Asia, and to Europe. On the contrary, Asia, in its north-east extremities, experiences extreme cold; partly, because on that side it has no land extending towards the equator. If Greeenland, under the 60th parallel, notwithstanding its southern exposure, and the neighbourhood of the sea, has a much more rigorous climate than Lapland under the 72d parallel, with a northern exposure, what other reason can be assigned for this phenomenon, than the separation of Lapland from the arctic region by means of a vast ocean, whilst Greenland, gradually widening, extends probably towards the pole, or at least towards the 82d degree of latitude? North America has few tracts of land situate in the torrid zone; it has little communication with South America, and it stretches out probably to the north of Baffin's Bay towards Greenland. This quarter of the world does not present so great a difference of climate as Europe.

There results also from our principles, a general consequence as to the countries of the torrid zone. The trade-winds, by blowing continually from the east over the sea, contribute to render all the maritime coasts on the eastern side colder than those coasts which look to the west. On the other hand, the more a continent extends from east to west, the more those winds are heated by passing over the lands scorched by the sun. This is the reason why the Antilles, or Caribbee Islands, enjoy so moderate a temperature, whilst Senegambia is afflicted with the most overpowering heat of which we have any example. Congo also is warmer than Zanguebar. If the mountains of Peru have a colder climate than Brazil, it is because the elevation of ground, or some other local circumstance, may often have sufficient influence to neutralize the effect of a general cause

Such are the different causes which concur in forming that general constitution of the atmosphere which is termed climate. We may perceive that the results

[a] See Africa, Cape de Verde Islands.

of so many different causes do not easily admit of classification. Hippocrates, indeed, has attempted it with regard to Greece. He takes for the basis of his arrangement, *exposure* and *winds*. But it is easy to prove, that his four climates, though actually existing in the places where he observed them, are not to be found in all the regions of the globe, to which his commentators, possessing little of his genius, wish to extend his system.

Hippocrates commences his treatise upon air, water, and situations, by an explanation of the object which he has in view. "It is necessary," says he, "for a physician, when entering a city of which he knows nothing, to examine its exposure, the predominant winds, the seasons, the nature and elevation of the soil, the quality of the waters of which the inhabitants make use, and the kind of life they follow. Now," continues he, "I am about to show how we ought to investigate and ascertain each of these circumstances."[a]

Is it not clear, according to this phrase, so vaguely rendered by all translators, that the intention of Hippocrates was not to compose a *treatise* upon physical climates, the materials for which were not collected together in his time, but that he meant nothing more by detailing his own local observations than to point out to his successors the path to be followed for the purpose of making new ones? This modest intention of the author has been overlooked, or at least but indistinctly pointed out. His work contains observations highly interesting, but confined exclusively to the countries which extend from the Sea of Azof to the mouth of the Nile, and from the borders of the Euphrates to the shores of Sicily; but these local observations, by being made general, have been converted into false and dangerous ones. We shall here produce some examples: Hippocrates represents to us "countries entirely exposed to the hot winds of the south, as necessarily abounding in brackish and unwholesome waters; for these waters, in general, not being deep, are warmed in summer, and cooled in winter." He then describes the maladies which will prevail in such regions: "The inhabitants have heads full of humidity and phlegm—they are destitute alike of strength and activity."[b]

These observations refer to the southern coasts of Greece and of Asia Minor, in the neighbourhood of the island where Hippocrates was born. According to Mariti, the whole of the south coast of the island of Cyprus frequently experiences an unwholesome state of the atmosphere; brackish waters are in abundance there, and the country is very unhealthy. The same observations hold true as to the coasts of Caramania, or ancient Cilicia. At Satalia, at Agas, and at Adana, the bad air compels the inhabitants, during summer, to retire towards the mountains. And why is the southern exposure of these countries so unwholesome? Strabo and Quintus Curtius tell us the reason. "Because Cilicia is a narrow plain, bounded on the north by the chain of Mount Taurus; and the winds which flow from the south being reflected by the mountains, cause suffocating heat; besides, there are marshes and stagnant ponds on the coast."[c] On the other hand, Cicero informs us, that the snow rendered the passage of Mount Taurus difficult before the month of June.[d] This is the reason why the temperature of the air and of the waters of Cilicia experience variations too great not to be hurtful. This observation undoubtedly admits of being applied to other countries where the same combination of circumstances takes place; the southern wind is known to be generally damp, hot, and unwholesome, upon the shores of the Mediterranean. In the island of Lesbos, according to Vitruvius, southern winds often cause epidemic complaints: in Attica, they once occasioned the plague. Virgil describes them as winds "whose damp breath is injurious to orchards, corn, and flocks."[e]

Let us extend this general character to the coasts of the Gulf of Persia. The southern winds there bring on the rainy season, and suffocating heat. At Susa, says Strabo, the inhabitants dare not expose themselves to the heat of the sun in the middle of the day. At Bassora, according to Otter, the southern wind paralyzes all the strength of the human body.

But let us pass to the opposite coast of Africa. Aristotle, in his day, knew that the southern winds are often cold, and always dry there, because they blow from Mount Atlas.[f] At Paris too, we have southern winds charged with the atmospheric cold of the mountains of Auvergne. These same winds are very cold in Suabia and in Bavaria, for they pass over the Alps. Every where winds are modified according to the nature of the places over which they blow.

We do not, however, stand in need of these examples. Does not Hippocrates himself immediately add, "But even among those towns, (exposed to the hot southern winds) such as are very much open to the sun and to the winds, ought to experience these disagreeable alternations in a less degree. In fact, Tarsus in Cilicia, notwithstanding its southern exposure, furnished an example of wholesome climate, and limpid waters.[g]

The Northern climate of Hippocrates is not more universal than that which we have been considering. Winds from the north at Archangel, and at Dantzig, bring humidity, and are less cold than the southern winds.[h]

These variations in the nature of winds do away with the other consequences. A proof of this is to be found in the Spanish peninsula, under the same latitude as northern Greece. The Asturias are exposed to the north; the climate is cold, but extremely damp. The prevalent diseases are a species of leprosy, dysenteries, scrofulous swellings, and others of that kind which the father of medicine attributes to southern exposures.[i]

The resemblance which Hippocrates endeavours to establish between the southern and eastern climate, is also unfounded as to western Europe, where the south winds more generally resemble those from the west in humidity and mildness; whilst, on the contrary, the winds from the east are evidently colder even than those from the north, because these east winds come to us

[a] Σκοπειν και βασανιζειν; literally, to look for and bring to the test.
[b] Hippocrates, de Aer., aquis, locis, §§ 9—14, edit. Coray.
[c] Strab. Geog. XIV. 260. Casaub. Atreb. Quint. Curt. III. c. 9—11.
[d] Cicer. Epist. ad Famil. XV. 4.
[e] Virg. Georg. I. 443. Bucol. II. 57. Vitruv. i. cap. 6.
[f] Aristot. Problemat. xxvi. 16—51. Comp. Aulus Gellius, xvi. 11. Lucan, Pharsal. ix. 447, *sqq.*
[g] Dio Chrysostom, Orat. de Tarso.
[h] Kant, Geographie Physique, iii. Part ii. p. 110.
[i] Casali, Annales des Voyages, t. viii. p. 76, *sqq.* Thierry, Observ. Medicales sur l'Espagne.

over central Russia, the Uralian mountains, and the confines of Siberia. The catarrhal affection which was prevalent in 1782, was generally ascribed to the severe cold suddenly brought on by an easterly wind, after a long continuance of warm south winds.

We are equally unwilling to admit the theory of Hippocrates with respect to *western climates*. "Every nation," says he, "exposed to the *western winds*, has an unwholesome climate, the waters which they drink are not limpid, because the morning fogs mingle with them before the sun has had time to dispel them. Secondly, The inhabitants of these places are exposed to sudden changes of temperature; for, in the summer mornings, cool winds blow, and dews fall; in the afternoon, the heat torments them. They have a pale complexion, and a feeble constitution. Breathing always a thick and unwholesome air, their voice becomes rough and hoarse. The west presents to us the image of autumn; the people who live under this climatological constitution, should participate in the maladies of the inhabitants of the north and south." A commentator adds, "They will join the ferocity of the natives of the north, to the fickleness of those of the south."

All these observations of Hippocrates, though sound and just, when properly restricted, become puerile and absurd when they are extended into general rules.

Who are there that lie more to the west than the Portuguese? Have they therefore a rough and hoarse voice? On the contrary, their language is infinitely softer than that of the Spaniards. Is the air which is breathed in Portugal thick and unwholesome? So far from it, that the English send thither their invalids to recover their health. Look to the Irish, who are continually exposed to storms from the west; have they a pale complexion? On the contrary, a native of Ireland may be distinguished by the freshness of his looks.

Has Hippocrates then advanced assertions which are utterly false? We disclaim the thought of bringing forward such an accusation. But he meant to speak only of certain countries of Greece, and his observations are just and profound when they are thus locally interpreted.

All the western coasts of Illyria, of Epirus, and of the Peloponnesus, have in fact that inconstant climate which Hippocrates compares to autumn. There the west wind often brings rain and fogs; and even in our days the impetuous and baneful west wind, of which Homer so often sings, is still felt in these regions.[a]

The Elians, according to Strabo, Hesychius, and Eustathius, had, of all the Greeks, the rudest pronunciation; that nation and their colonies often inserted a canine letter (r) where the other Greeks put none, they said *heror* or *her* instead of *Heros*.[b]

The Etolians probably spoke still worse, their ferocity besides is well known. Polybius and Thucydides considered them as *semi-barbarians*.[c] Lastly, the inhabitants of the island of Zante, according to Scrofani, have a pale complexion. The western Greeks were in general not so tall as those of the east and the north. Ulysses was called by the Etrurians the *wandering dwarf*.

Thus are the observations of Hippocrates justified; and this, we presume, is the true way of reading and explaining an ancient author, by comparing him with other writers who were his cotemporaries, or his countrymen. The critical examination of the four climates of Hippocrates should convince us of the impossibility of founding a classification of temperatures on the *causes* which produce them, since every one of these causes varies with geographical circumstances. It is by considering the principal combinations of the properties which characterize climates, that we can classify them in a general manner. Heat and cold may be accompanied with humidity and dryness; from thence there results four principal climates.

We have first the *hot and dry* climate. Such is in an extreme degree that of the deserts of Sahara and of Arabia. The earth beneath is scorching, the sky above is on fire; even the brackish water is scarce and valuable as gold; plants languish for want of nutriment; the men and animals indeed are strong and brawny, but few in number; olive complexions and bilious temperaments prevail among the natives of these countries. Their ferocious and sanguinary dispositions correspond to the character under which nature has appeared in these dreary and inhospitable regions.

The *hot and humid climate* prevails in Bengal, in Mesopotamia, on the coasts of Zanguebar, Senegambia, Guayana, and Panama; these countries enjoy the verdure of perpetual spring, and furnish the most gigantic productions of the vegetable kingdom; but there also reptiles of unwieldy length wallow in the mud of marshes, steaming with pestilence; there man, robust in his frame of body, propagates with rapidity, but his moral character is sunk almost as low as that of the brutes. The deep swarthy[d] skin, and the phlegmatic temperament belong peculiarly to these countries.

The *cold and dry* climate supports a hardy, though certainly not a profuse vegetation; the waters are generally pure but hard; animals and men, respiring more oxygen, are strong, active, and healthy; the moral and the physical part are in a state of equilibrium. They propagate slowly but with regularity; the sanguine temperament, and the white skin, are characteristic of this climate, which comprehends the greatest part of Europe and of Asia.

The *cold and humid* climate, in its extreme, such as is experienced in Siberia, and to the north of Canada, envelops the atmosphere with unwholesome fogs, and reduces vegetation to a few cheerless stunted shrubs, and to creeping moss. The animals are covered with a thick fur, under which they remain torpid one-half of the year. Man himself, tall, but weak and sluggish, thinks only of defending his physical existence against the unkindness of nature. The red copper-coloured skin, and the melancholic temperament, seem to be the native growth of such a climate.

By unfolding, in this manner, the views of the celebrated philosopher Kant,[e] our design has been only to exhibit a sketch of the combinations of extreme temperatures, and their most probable effects. We admit,

[a] Homer, Odyss. v. 295.; xii. 289.; xiv. 458.
[b] Strab. x. 308. Hesychius, in voce, Eretria. Eustat. in Iliad. ii. 279.
[c] Polybius, xvii. p. 476, edit. Casaub. Thucydides, iii. chap. 94.

[d] "Noire," black.—P.
[e] Memoir upon the four principal constitutions of the human race in the collection, entitled, Mundane Philosopher, by Engel. (in German

hat the four principal climates are, perhaps, no where to be found without some modifications, which alter their nature. These *modifications* are of two kinds; the one kind arises from a succession of two different climates in the same region; the other is owing to the more or less elevated degree of each of the four qualities which constitute climate. It is these modifications which, in opposition to the system of Hippocrates, can entitle any climate whatever to the appellation of *temperate*, since the true sense of this term denotes an atmospherical constitution in which the hot, the dry, and the humid, are equally moderated by each other. Thus, in Egypt, the succession of humid heat, during an inundation, and of dry heat for the remainder of the year, tempers a climate, which, without either alternative, would be insupportable. Thus, the Dutch see with pleasure the dry cold succeed the humid cold, which, of itself, would render their country extremely insalubrious. At other times, the succession taking place too rapidly, or the two temperatures being too remote the one from the other, the climate is rendered more disagreeable than if one uniform temperature continued. It is thus that the inhabitants of Astrachan, and of some other towns, feel in summer the heat of Africa, and in winter the cold of Siberia. These atmospherical constitutions are also modified by the solar climate; thus, the dry heat, which renders Sahara almost inaccessible, becomes, at Madrid or at Marseilles, a temperature very suitable to man. The baneful effects of humid heat, are, in like manner weakened, as we recede from the equator. On the other hand, we find the cold, dry or damp, more and more supportable as we advance from the pole towards the tropics. For example, at Bergen in Norway, and at Brest in France, there is always the same constitution of winter rendered variable and humid from the vicinity of an ocean which never freezes. But how great is the difference in the intensity of the cold!

These observations upon the true acceptation of the word climate naturally lead us to take a general view of the different temperatures of the five zones into which we are accustomed to divide the globe.

The *torrid zone* experiences only two seasons, the one *dry*, and the other *rainy*.[a] The former is looked upon as the summer, the latter as the winter of these climates; but they are in direct opposition to the celestial winter and summer,—for the rain always accompanies the sun, so that, when that luminary is in the northern signs, the countries to the north of the line have their rainy season. It appears that the presence of the sun in the zenith of a country, continually heats and rarefies its atmosphere. The equilibrium is every moment subverted, the cold air of countries nearer the poles is incessantly attracted, it condenses the vapours suspended in the atmosphere, and thus occasions almost continual rains. The countries of the torrid zone where no vapours rise into the air, are never visited by the rainy season.

Local circumstances, particularly high chains of mountains, which either arrest or alter the course of the monsoons and the winds, exercise such influence over the physical seasons of the torrid zone, that frequently an interval of not more than several leagues separates summer from winter. In other places, there are two rainy and two dry seasons, which are distinguished by the names of *great* and *little*.

The heat is almost always the same within 10 or 15 degrees of the equinoctial line; but towards the tropics, there is quite a difference between the temperature which prevails at the moment the sun is in the zenith, and that which obtains, when, in the opposite solstice, the solar rays fall under an angle of more than 47 degrees. We may therefore, with Polybius, divide the torrid zone into three others. The *equatorial zone*, properly so called, is temperate, compared with the *zone of the Tropic of Cancer*, composed of the hottest and least habitable regions of the earth. The greatest natural heat ever observed, which is 35 degrees of Reaumur, (111° Fahr.) has been at Bagdad, at 33 degrees of latitude. The *zone of the Tropic of Capricorn* contains but little land, but it appears to experience momentary heats of extreme intensity.

Most of the ancients, disregarding the observation of Polybius, conceived that the heat continued to increase from the tropic towards the equator. Hence they concluded that the middle of the zone was uninhabitable. It is now ascertained that many circumstances combine to establish even there a temperature that is supportable. The clouds; the great rains; the nights naturally very cool, their duration being equal to that of the days; a strong evaporation; the vast expanse of the sea; the proximity of very high mountains, covered with perpetual snow; the trade winds, and the periodical inundations, equally contribute to diminish the heat. This is the reason why, in the torrid zone, we meet with all kinds of climates. The plains are burnt up by the heat of the sun. All the eastern coasts of the great continents, fanned by the trade winds, enjoy a mild temperature. The elevated districts are even cold; the valley of Quito is always green; and perhaps the interior of Africa contains more than one region which nature has gifted with the same privilege.

Nothing equals the majestic beauty of the summer in the torrid zone. The sun rises vertically—it traverses in an instant the burning clouds of the east, and fills the heavens with a light, whose effulgent splendour is unobscured by a single shade. The moon shines there with a more brilliant lustre; Venus blazes with purer and more vivid rays, and the milky way glitters with augmented brightness. To this magnificence of the heavens, we must add, the serenity of the air, the smoothness of the waves, the luxuriance of vegetation, the gigantic forms of plants and animals, all nature more grand, more animated, and yet less inconstant and less changeable.

The temperate zones, on the other hand,[b] are indemnified by the mild and varied charms of spring and autumn, by the moderate heat of summer, and the salutary rigours of winter. This succession of four seasons is not known beyond the tropic, nor towards the poles. Even that part of the northern temperate zone which lies between the tropic and the 35th degree of latitude in many places resembles the torrid zone. Until we

[a] Varen. Géographie Générale, ch. xxvi. propos. 10. *sqq.* Bergmann, Géog. Physique, § 143.

[b] Bergmann, Géographie Physique, § 144.

come towards the 40th degree, the frost in the plains is neither intense nor of long duration—it is equally unusual to see snow fall there, though unquestionably it is not true, that when a fall of snow does take place, the ladies of Rome or of Naples leave the theatre to enjoy so extraordinary a spectacle, or that the Academicians run out, with their glasses in their hands, to examine this singular phenomenon. Elevated countries feel all the rigour of winter—and the trees even in the plains lose their foliage, and remain stripped of verdure during the months of November and December.

It is from the 40th to the 60th degree, that the succession of the four seasons is most regular and most perceptible, without however endangering the health of man: and it is within these latitudes that we must look for the nations that are most distinguished for knowledge and civilization, and those who display the greatest courage by sea and by land. It would appear, that in countries where there is no summer, the inhabitants are destitute of genius, or at least of intelligence[a] and taste; while in those regions where there is no winter, true valour, constancy, and loyalty, as well as other civil and military virtues, are almost unknown. But, let us remember, that it is man himself, who has in a great measure created these salubrious climates;—France, Germany, and England, not more than twenty centuries ago, resembled Canada, and Chinese Tartary, countries situated, as well as our Europe, at a mean distance between the equator and the pole.

Beyond the 60th degree, and as far as the 78th, (which appears to be the limit of the habitable earth in the northern hemisphere,) only two seasons are generally known; a long and rigorous winter, succeeded often suddenly by insupportable heats. The power of the solar beams, though feeble, from the obliquity of their direction, accumulates during the days, which are extremely long, and produces effects which might be expected only in the torrid zone. There have been examples of forests having been set on fire, and of the pitch melting on the sides of ships. In winter, on the contrary, brandy has been frozen in heated rooms; a crust of ice has covered even the sheets of the bed; the earth has been found frozen to the depth of 100 feet;[b] and mercury, congealed in the thermometer, leaves the degree of cold indeterminate. I speak here of extreme cases, and of the zone in general. For, in some places, a southern exposure, and the neighbourhood of the ocean, soften the climate to an almost incredible degree. Bergen, in Norway, and the whole of the adjoining coast, between 60 and 62 degrees of latitude, has a very rainy winter, but seldom snow or frost—that season of the year is there less rigorous, and requires less fuel than at *Cracow*, or *Prague*, or *Vienna*, in *Austria*, between the 48th and 50th degrees of latitude. The frigid zone enjoys an atmospheric calm which is unknown in temperate regions—it has no storms, no hail, scarcely a tempest—the splendours of the aurora borealis, reflected by the snow, dispel the darkness of the polar night. The days for several months, though of a monotonous magnificence, astonishingly accelerate the growth of vegetation. In three days, or rather three times twenty-four hours, the snow is melted, and the flowers begin to blow.

This succession of physical zones is not equal in the two hemispheres. When speaking of the ice of the sea, we observed, that, in the arctic seas, we scarcely meet with the large floating masses before we arrive at the 70th degree, nor the stationary fields, until towards the 75th or 80th degrees of latitude; while, in the antarctic seas, both occur at from 50 to 60 degrees of southern latitude. In the island of Terra del Fuego, in Sandwich Land, and in several other islands situated towards the 54th and 59th degrees of south latitude, the mountains even in the southern summer remain covered with snow quite to the shores of the sea.[c d]

This diminution of heat appears to cease all at once between the 30th and 40th degrees of latitude; for hot winds arise from the interior of New Holland, whilst the mountains of Van Diemen's Land remain covered with perpetual snow;[e] thus there is felt in these latitudes the most sudden transition from a suffocating heat to a very sensible cold.[f]

Astronomers[g] seem to ascribe this contrast solely to the shorter stay which the sun makes in the southern signs; that is to say, to the greater rapidity of the earth's motion when it is in its perihelion. The sun's stay is 7 days and 18 hours shorter in the southern than in the northern signs. But the difference produced by this cause would be only $\frac{1}{2\,3}$, while the actual existing difference is nearly $\frac{1}{7}$. The theory of radiant heat has furnished another explanation; and an attempt has been made to demonstrate, that in a given time, the southern hemisphere gives out a greater quantity of its own constant heat than the northern.[h] But this cause should not all at once cease to act towards the 40th degree. It is necessary, therefore, to search for the cause of this phenomenon in the earth itself.

The vast extent of the antarctic seas, the total absence of any great extent of land, and the form of the continents which terminate towards the south, almost in points, open a free and unincumbered field to the currents from the polar seas; and allow them to push forward the icy masses in every direction from the south pole towards the southern temperate zone. There some of them accumulate, and are stopped by getting entangled with each other; some of them are hindered from advancing further by the force of the general movement of the ocean towards the west, which must now be very perceptible; and some of them melt by the action of the solar heat, which must be considerable at 50 degrees, although it has but little effect upon the thermometer, because the ice in melting absorbs it the moment it is diffused through the air.

As there is no *fixed limit* where the motion of the polar waters towards the equator stops, and changes

[a] "Esprit," fancy, wit.—P.
[b] Gmelin, Voyage en Sibérie.
[c] Foster, Cook, Dalrymple, &c.
[d] The general opinion that the S. hemisphere is colder than the N., is contradicted by recent observations. The S. hemisphere is, on the contrary, the warmest, and considerably so. This might be expected from the greater extent of sea in that hemisphere, and from the sea being open to a much higher latitude. The climate of S. Africa and S Chili is warmer than the corresponding N. latitudes.—P.
[e] Péron, Voyage aux Terres Australes, ii. (inedit.)
[f] Labillardiere, Voyage à la recherche de La Pérouse, ii. 27.
[g] Mairan, Mém. de l'Académie, 1765, p. 174. Æpinus, Cogitat. de distribut. calor. per tellurem.
[h] Prevost, sur le calorique rayonnant, p. 328, *sqq.*

into the general motion towards the west,[a] this change depending on the influence of several local and temporary causes, as little will there be any determinate boundary for the southern ice. Accordingly, navigators have sometimes met with fixed islands of ice towards the 50th degree, and sometimes they have advanced 10 degrees nearer the southern pole, and met only with floating pieces. These variations of their latitude, under the same meridian, seem to establish our explanation: it seems, indeed, impossible to assign any other sufficient cause than the action of the polar currents. These moveable masses of ice, propelled on all sides towards the tropic of Capricorn, are stopped in their progress only when they meet with currents which set to the west, and which, as they draw them along, impart to them a compound motion—a motion which, being constantly modified by the equatorial current, makes them describe a spiral line until they melt. They thus enter unexpectedly into a zone otherwise temperate, where their presence causes those sudden transitions from heat to cold, and those extensive fogs, which are spoken of by navigators.

In adopting this explanation, we are under no necessity of supposing the *quantity* of southern ice to be so enormous as it would be according to any other hypothesis; for upon our principle, the ice, which appears about the 50th and 60th degrees of latitude, would not mark the circumference of a spherical cap of fixed ice around the pole, but would only form a girdle or belt of variable width, behind which there might be found vast expanses of sea, which from time to time would contain no ice.[b]

The theory of physical climate suggests still another inquiry: Can we admit a change in the direction of the terrestrial axis? This inquiry is highly interesting, not only to geographers, but to the whole of the human race. Without the obliquity of the ecliptic, without that angle of inclination, which exists between the plane of its diurnal revolution and the plane of its orbit, there would be no inequality between the days of winter and summer, and no change of seasons as far as that depends upon celestial causes; the equator would be still more constantly heated than it is at present, and we should perceive the heat diminish on both of its sides in a very rapid progression; each climate would have an invariable temperature, which would be that of its present spring and autumn, but very probably somewhat lower. The earth would then be scarcely habitable beyond the 45th or 50th degree of latitude. Such, then, would be that eternal spring which the poets wish us to deplore the want of. Many philosophers and astronomers entertain the opinion that the ecliptic and the equator actually tend to coincide. The ancient astronomers found the obliquity of the ecliptic to be 24 degrees. Eratosthenes, 250 years before Christ, found it to be 23 degrees 50 minutes. Albategnius, in 880, 23 degrees, 35 minutes, 40 seconds. Tycho-Brahe, in 1587, 23 degrees, 31 minutes, 30 seconds. It oscillates in our day around 23 degrees, 23 minutes. Its average diminution for each century seems to have been hitherto 57 seconds. But Euler and Laplace have proved, by profound calculations, that this diminution arises from the mutual attraction of all the planets, the orbits of which being differently inclined, seek constantly to mingle in the same plane, from whence there result only temporary inequalities, confined within determinate bounds. The sun contributes above all constantly to bring back all these variations to the point whence they had originated. Were it not for the attractive force of the sun, the planets, especially Jupiter and Venus, might have power to change the obliquity of the ecliptic from 10 to 12 degrees. But the mighty monarch of the planetary system represses these attempts, and prevents the obliquity from ever varying more than from 2 to 3 degrees. In general the whole system of the world appears now to oscillate round a mean state, from which it deviates only very insensibly either to the one side or the other. The violent contests between the great powers of nature have ceased; we live in a period of physical repose, but we perceive around us the traces of anterior revolutions. These are about to become the subject of our inquiries.

[a] See Book xiv. p. 121, 122, *et seq.*

[b] This fact has been proved by the voyage of Capt. Weddel. See notes p. 60 and 118.—P.

BOOK XVIII.

Continuation of the Theory of Geography.—Of the Revolutions which have taken place upon the Surface of the Globe.

We have now described the existing physical state of the terrestrial globe; and at every stage in our progress, we have seen that the order of things which now subsists, must have been preceded by several orders of a different kind. The existence of the material world is only a series of metamorphoses. As in the ocean wave sinks into and blends with wave, so the elements, agitated by a never-ceasing motion, mingle, and combine, and replace each other, under forms continually changing and continually renewed.

In this ebb and flow of existence and destruction, we float along like the light and unsteady leaves, which are borne, heaved aloft, hurried on, and swallowed up by one and the same billow. How then should we hope to form a conception of the unmeasured chain of revolutions which our globe may have undergone? We walk upon the wrecks of anterior worlds; but can we compute their number? The lapse of ages has heaped up ruins upon ruins: at every step we tread on monuments, upon which the hand of nature has engraved the history of the globe; but the record is couched in hieroglyphical symbols, the key to which shall never perhaps be found.

The feeble light which reasoning or experience has furnished, relates to two classes of changes which have taken place on the globe. Some repeatedly occur under our own observation, or at least have been observed by men who have conveyed accounts of them to us. Other revolutions are known to us only by their astonishing effects, and by traces which it becomes us to follow in silence, resolved to stop where they cease to guide us. It is of importance to separate, with rigorous exactness, the class of *supposed* or *inferred* facts, from that of *established* facts. But already among the ancients enthusiasm had singularly perplexed this question: the inventors of geological systems brought forward as historical facts, events which had not any contemporary and substantial authority: the vague descriptions of poets, and even popular traditions, were collected and repeated without undergoing any scrutiny. Aristotle complained in Greece of this abuse. Pliny, in a later age, introduced it at Rome. As to the moderns, who have undertaken to write the history of the changes which have happened on the surface of the globe, they have chosen rather to display superficial erudition, by compiling anew what the ancients had compiled before them, than to make use of that difficult art by which facts of an established and definite character are distinguished from uncertain traditions that are altogether unfit for the purpose of the philosopher. It is an undertaking beyond our strength to re-establish historical truth in all its purity: we shall, however, refrain from repeating any of the fables with which geologists have adorned the first ages of the history of the globe.

The changes whose actual occurrence is capable of proof, are marked by characters which are extremely different. Some have taken place with the most inconceivable rapidity; while, in the imperceptible progress of others, we perceive that the power of time has no limits.

Of all the known powers and agents, there is none which has not contributed, however little it may have been, to change the surface of the globe. Fire performs the most conspicuous and noisy part; but water appears to have had a still wider sphere of activity. The air conceals under its appearance of weakness a very powerful disintegrating and recompounding energy. The earth itself, by yielding obedience to the laws of equilibrium, has assisted in giving shape to its own surface. And the labours of man, though in the last rank, occupy a place in some corners of this vast picture.—We shall now take a rapid survey of the annals of the globe.

The atmosphere generates meteors whose slow but continual effects, by accumulating from age to age, must collectively amount to an incalculable sum.

The winds, which uproot entire forests, have laid, in some remote period, the foundations of coal mines. The rains, by running down the sides of the mountains, bare and roughen some parts of them; whilst, to other parts, they give roundness and elevation. The hail and the snow harden and accumulate into vast masses of ice and snow,[a] whence flow the impetuous rivers which excavate the valleys. Ramond observed the summits of the Pyrenees every where furrowed by thunderbolts. But the air of itself is possessed of a very considerable dissolving power; it ultimately decomposes all known substances. The most solid rock is cleft, and divided into stones; the stones crumble into gravel, or dissolve into sand, which are lifted by the winds, or rolled by the waters to a great distance from their original soil.

The succession of heat and humidity accelerates that slow disintegration which is continually going on before our eyes. The air disseminates the pollen, or fructifying dust of plants, transports whole clouds of sand and of volcanic ashes, and holds in solution a great number of watery, saline, and earthy particles. It contributes, therefore, incontestibly to change the surface of the earth.

This action of the air is especially perceptible in the continual extension of *moving sands*. The effects of it have been severely experienced near St. Pol de Leon, in Bretagne, where a whole village was so completely buried beneath the sand, that nothing was seen but the spire of the church.[b] England, Jutland, and Scania, have undergone, and do still undergo, similar inundations. In Greenland, the famous ridge of hills of pure

[a] "Glaciers."

[b] Mémoires de l'Academie des Sciences de Paris, 1722.

ice, named the Iceblink, is situated between two promontories of moving sand with which the winds sometimes strew the decks of vessels more than 12 leagues distant.[a] Thus the phenomena of the African deserts are met with near the pole. In Jutland, we have seen places where the sand is so extremely fine, as to exhibit the appearance of a fluid mass in which we might swim. It is easy to conceive that the wind may carry this powder to considerable distances, and in this manner create new deserts of sand.

The industry of man, by paving streets, by building houses, by spreading manure over the fields, by erecting dikes along the sides of rivers, tends insensibly, but powerfully, to elevate the soil of a country. We perceive this chiefly in towns near ancient buildings. To enter the Pantheon at Rome, it was once necessary to ascend eight steps: we must now descend as many. Nor should it be alleged that the building has sunk, for it has preserved the same level for two centuries past.[b]

Aquatic plants often change a marsh into a damp meadow. These are, first, the *hippuris*, the *utricularicæ*, the *equisetum*, and different rushes which form with their interwoven roots a floating tissue upon the muddy water. Next, the *sphagnum palustre* is diffused over the whole surface, absorbs the water like a sponge, and creates a bed for the briers and lichens which thicken and raise the soil by their annual depositions. At other times, the expanse of a tranquil bay is peopled by *water lilies*, the *arundo phragmites*, and other plants which retain the earthy particles cast up by the waters without. As soon as this mud has acquired a little solidity, we see willows spring up, together with osiers and other trees which prefer an aquatic soil.[c]

Vegetation contributes in various other ways to change the appearance of the earth. Observe that slender plant, that moss which mounts up along the walls of a deserted palace. By being repeatedly decomposed and renovated, it will, some ages hence, have covered, and even have buried beneath it, those stately piles which were reared by luxury for the residence of sovereign power. The remains of the vilest animals are collected in heaps where the thrones of monarchs once glittered with splendour. Brambles cover the temple of Olympic Jupiter, and the towers of Babylon lie concealed beneath the grass.

Mountains *sink down*, or *separate into fragments*, from the agency of other causes than earthquakes or volcanic explosions. Sometimes the waters of a rapid river, of an agitated lake, or even of a subterraneous current, waste, consume, and secretly undermine a mass of rocks, or of solid earth. The beds of sand, gravel, clay, and chalk, which serve as a support, are dissolved or swept away; an excavation is formed, and the superincumbent mass sinks down by its own weight. At other times, subterraneous waters penetrate under a new stratum, under a vegetable bed; they at first support this crust, then loosen it, tear it off, and at last finally wash it away piece-meal, or swallow it entirely up. Sometimes there is a fissure, by means of which part of a mountain is detached from the principal mass, and overturned in consequence of being deprived of its natural support. These kinds of fissures are in the argillaceous rocks, the effects merely of dryness, accompanied by the shrinking of certain particles; in calcareous rocks, a species of fermentation may very much contribute to produce them; and in granite rocks they appear to arise from the decomposition of certain laminæ of a less powerful crystallization, acted on by the oxygen of the atmosphere.[d] The granite of Finland, named Rapakivi, is decomposed wherever there predominates in its composition a kind of ferruginous, or sulphuro-ferruginous mica.[e] Bergmann has often seen petrosilex covered with a slightly coherent crust, which, when washed off by the waters, exposes to view small fragments of quartz and ferruginous garnets. Thus the mountains may be destroyed even by the influence of that imperceptible humidity which is inherent in all terrestrial substances.

There can be no doubt that these two kinds of subsiding, must have contributed to the formation of the existing surface of the globe. We perceive every where around us nothing but wrecks and ruins; those beds of rocks, displaced, overturned, shattered; those lakes so deeply excavated; those caverns which reach down towards the centre of the earth; those peaks which tower to the sky; those precipitous coasts which surround as with an immense rampart all the seas of the globe; those alps which overhang Italy; those Andes which plunge their gigantic sides into the ocean; those forests, those races of quadrupeds, those aquatic animals buried in the earth in mingled confusion; all these circumstances impress us with the awful and overwhelming thought, how vast must have been the heavings and agitations which have contributed to give to the globe its present appearance.

M. Deluc has very happily applied this physical truth to illustrate the account of a universal deluge contained in the sacred writings. According to him, this catastrophe, which some have endeavoured to represent as impossible, may be naturally explained, merely on the supposition of a general sinking down of the inhabited regions of the earth; then the waters of the sea, instead of being elevated, as has been generally imagined, would have needed only to follow the laws of gravitation, in order to cover the *antediluvian* world, and leave dry our present continent.

But we wish to speak here of facts of which history has preserved the details.

The subsidings which take place from excavations made by water, happen yearly in mountainous countries along rivers. It is thus that the Rhone has formed the vault under which it appears to lose itself; it is thus that the Adige swallowed up the town of Neumark and others in 1767. In the south of Norway, the rapid Glommen descends from the summit of the Dofrine mountains towards the North Sea, and forms, a little above its mouth, the fine cascade of Sarpen. The eddy of the waters of

[a] Crantz, Relation du Groenland. Egede, &c. &c.
[b] Bergmann, Géographie Physique, § 148, ii. 170.
[c] Misson, Voyage d'Italie, ii. 195.
[d] This disintegration of granite and gneiss, from the decomposition of their feldspar and mica, is not uncommon, particularly in the veins of coarse-grained granite pervading gneiss and mica-schist. I have seen the primitive rocks bordering the low country, in the southern and middle states, decomposed into gravel to a considerable depth from their surface, and yet distinctly retaining their structure.—P.
[e] Gadd, Dissertations sur le Granite, cited by Bergmann, Geog Phys. § 151.

the cascade had formed under the bank a subterranean lake 600 feet in depth. On the 5th February 1702, the Castle of Borge, with all its dependencies, was ingulphed in this excavation, and entirely disappeared, so that there appeared nothing in its place but a lake 800 feet long, and from 300 to 400 broad.[a] The disaster which befel the town of Pleurs, in the country of Chiavenna, arose from a similar cause. Rivulets and springs without number wore away the frail foundations of Mount Conto; on the 25th August 1618, the masses of rock of which that mountain was composed, separated from each other and rolled upon the town, which they completely overwhelmed, as well as the small town of Schilano; 2430 individuals perished; a lake occupied the place where 200 elegant houses once stood. All the wealth, which for a century commerce had amassed, was at once restored to the maternal bosom of the earth.[b]

Plains experience depressions of another kind. Platforms of turf suspended over water, sink under the weight of forests, houses, and inhabitants. Ireland every year sees the number of its lakes increase by the sinking in of its bogs. It is to these that *subterraneous forests*, in some measure, owe their origin. There are some which, like those on the shores of Lincolnshire,[c] are formed conjointly by the sinking down of marshy coasts, and by ancient invasions of the sea. Others, like that which has been discovered near Morlaix,[d] appear to owe their subterraneous situation to changes anterior to the existing state of the globe, but for the most part, they are met with in turf or peat grounds. In the Isle of Man, accordingly, in the midst of a marsh, at the depth of 20 feet, fir trees are found still on their roots. At Hatfield-chace, we find trees which have their nuts and acorns lying at their sides. Holland, Switzerland, and France, present similar facts; but it is Sweden which furnishes us with the most curious example. Near Asarp, in West Gothland, there are two peat bogs composed of a thick mud, and of a light turf. We discover there a great quantity of trunks, and roots, which are carried off every year to serve as fuel; the following year they are equally abundant, which arises unquestionably from an immense collection of trees buried in this peat ground, and raised to the surface by the annual thaw.[e]

In the Electoral March of Brandenburgh, there is the lake of Arendt, formed by two subsidings, the one, it is believed, happened in 815, the other in 1685. How many lakes are thus formed in Prussia and in Poland! How many other events are there of this nature, the knowledge of which is lost to us, or has been disfigured by tradition! Strabo tells us, that around the Lake Copaïs, in Bœotia, the sinkings of the ground were very numerous, and often changed the course of the river Cephissus, which at last flowed in subterraneous canals constructed by the hand of man. As these canals are no longer kept in repair, and as the lake Copaïs is changed into a marsh, we may ask, what has become of the waters of the Cephissus? It appears only too probable that they have hollowed out a subterraneous reservoir, an invisible lake, but which may one day swallow up Bœotia, and thus renew the *deluge of Ogyges*.

We have spoken of subterraneous lakes, and among others of that in East Friesland, which was open in the 12th century; by degrees there was formed on its surface a crust of peaty and slimy substances, which in their turn were covered with vegetable mould. This crust is now strong enough for a carriage to pass over it, and to be laboured, sown, and reaped. At the same time the inhabitants have only to make holes from two to four feet deep, to find water to serve them for steeping their flax. There probably exists a subterraneous lake near Narbonne, in the territory of Liviere. We there see five abysses, named the *Oeliols*, of an extraordinary depth, and filled with fish; the earth which surrounds them trembles under the steps of the adventurous peasants who are attracted thither for the sake of fishing.

We may easily conceive the disasters which, from time to time, indicate the existence of these subterraneous lakes, in places where no one suspected them. In 1792 a lake was formed in the town of Lons-le-Saulnier; several houses disappeared, as well as a part of the high road from Lyons to Strasbourg.[f] It is supposed that this was an old pond of brackish water; on which at first there was formed a pellicle, then a slight vegetable crust, and then ground, to all appearance, solid; but a great drought having made the subterraneous waters fall, this crust was deprived of support, and consequently sunk down. Mount Jura presents a number of vestiges of similar sinkings. The Pyrenees, another calcareous chain, exhibit them in as great abundance. Buffon relates, that a mountain in 1678, having sunk down into subterraneous cavities filled with water, caused a great inundation in a part of Gascony. The Julian Alps, where is the famous lake of Cirknitz, contain in their numerous caverns many similar reservoirs.

Justly, then, might Seneca ask, "In what part of the globe has not nature waters at her command, to assail us with, whenever she pleases? Our excavations, our pits, almost every where terminate in water. Let us add, also, those immense invisible lakes, those subterraneous seas, those rivers which are enveloped in continual night. How many causes are there of inundation in those waters which flow beneath us and around us? For a long time prisoners, they will one day set themselves at liberty; the rocks, opening on all sides, will furnish numerous currents of water, which will rush towards the ocean. These deluges of water or fire happen whenever it pleases the Almighty to recommence a more perfect order of things."

We are now to speak of subsidings, in which the agency of water has not been immediate and predominant; for rarely does a disaster happen, in the production of which this element is entirely inactive.

Many mountains, as we have seen, are originally composed of large stones, perfectly detached from each other.

[a] Pontoppidan, Hist. Nat. de la Norwège, i. ch. 3. § 14.
[b] Camerari, Dissertat. vi.
[c] Correa de Serra, in the Annales des Voyages, i. 169. *sqq.*
[d] Fruglaye, Journal des Mines, No. 110.
[e] Bergmann, Géographie Physique, ii. 244. Rothof, Mém. de l'Academie des Sciences de Stockholm, 1767.
[f] Bertrand, Nouv. Principes de Géologie, p. 198.

There are many such mountains between Norway and Sweden. A transverse section of Mount Quedlie shows a mass or stratum of 240 feet, composed of small flat stones, some calcareous, some sandy, and always without any cement to bind them together. The slightest force is sufficient to roll down these masses, which have been formed by changes anterior to the records of history.

There are other causes which concur in decomposing the most solid mountains; extreme cold often makes large blocks of rock burst asunder and tumble down. In West Gothland, near Hunneberg, there are two regular pillars detached from a rock, solely by the action of frost.[a b]

Norway suffers great devastations from avalanches of stones, which are in like manner occasioned by the effects of cold. In the milder climates, the successive action of cold and heat is not less destructive, though more silent. In those same mountains of West Gothland, of which we have just now spoken, Bergmann has observed that the rocks of trapp had a paler and more porous crust on the side lying towards the sun.

In a great many places the skeletons of mountains attest these changes. Near Adersbach, in Bohemia, you pass through a sort of labyrinth of blocks of freestone, placed perpendicularly, from 100 to 200 feet high, and of a circumference equal to the half of their height. These columns, or rather these square towers, occupy a space of ground a league and one-third in length, and half a league in breadth. A rivulet meanders among them, and loses itself in a gulf. The verdant foliage of trees and shrubs is mingled with the gray masses of the rocks. This labyrinth is evidently the remains of a mountain, the less solid parts of which have crumbled down, and been carried off by currents of water. The famous *stones of Carnac*, which the vulgar regard as a Druidical temple, appear to us only a labyrinth of Adersbach in miniature. Other countries present similar pictures: such as Stonehenge in England, Griffenstein in Saxony, the rocks of Svit-Feene in China, and several assemblages of enormous stones in the Cordilleras of Peru. The primitive nations chose such places, stamped with the impress of divine power, to solemnize the rites which they dedicated to beings of a superior nature.

The slow, but continual and combined action of all the causes which we have specified, is followed by the most astonishing catastrophes.

The remains of the mountain called the Diablerets, in Switzerland, present, it is said, a very picturesque scene; portions of wood and pasturage, which have escaped the common disaster,—rocks, shivered, dismantled, cleft from top to bottom, and seeming to announce new desolations,—torrents, which are forced to scoop out for themselves a new bed, wear away the trunks of larches and firs, half buried in their waves. Such are the varied groupes which adorn this theatre of devastation.

It was, according to the History of the Academy of Sciences, in the month of June 1714, but, according to M. Bourrit, and other Swiss writers, the 23d September 1713, that the summits of the Diablerets suddenly fell, and covered the extent of a square league with their fragments, which often form a bed of stones 30 yards and more in thickness. Although several hundred cottages were buried in the ruins, fortunately only 18 persons perished. Cows, goats, and sheep, were the principal victims. The dust which was raised by the fall of the mountain occasioned for some moments a darkness like that of night, although the event took place at three o'clock in the afternoon, and in fine weather.[c]

We have a more satisfactory account of the falling down of a mountain, which took place in 1751, near Sallenche, in Savoy. The naturalist Donati thus describes this event: A great part of the mountain, situated below that which fell down, was composed of earth and stone, not arranged in strata or beds, but confusedly heaped up. The rolling down of these stones, in former times, had left by degrees the principal rock of the greater mountain without support. This mass was composed of five horizontal and distinct beds: the two first were of a slaty and brittle kind; the two following presented to view a shelly marble, cleft transversely to its strata. In the fifth, the slate re-appeared, but its laminæ were in a vertical position, and entirely disunited. The waters of three lakes, formed in this last stratum, continually penetrated through the chinks of the mountain. The abundant snow of the year 1751 augmented the force of these waters, and determined the fall of 648 millions of cubit feet of rocks, bulk enough to have formed a great mountain. The fall of this mountain was accompanied by a quantity of dust uncommonly subtile, and which was taken for smoke, because it supported itself in the air for several days. A report was spread that a new volcano had broken out in the midst of the Alps, where the ravages of subterraneous fires had never been known. But Donati, having been sent to the spot, soon dissipated these groundless fears.[d e]

There is also another kind of catastrophe, which is not less extraordinary in its causes, nor less destructive in its effects:—it happens when one bed of earth or rock slides over another bed without breaking, or separating into pieces. Some years ago, the commencement of an event of this kind was observed at Solutré, near Macon. After great rains, the strata of earth which lay upon the mountain of Solutré, slid along over the beds of limestone, which constitute the body of the mountain. They had already advanced several hundred yards, and the village was about to be buried in ruins, when the rain

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[a] Bergmann, Géographie Physique, ii. 242.

[b] This detachment of fragments from rocks, which naturally cleave into blocks and pillars, such as granite, trapp, and basalt, is constantly going forward, particularly at the breaking up of winters. It is this which has accumulated the slopes of debris or *shingle*, at the foot of such rocks, particularly greenstone.—P.

[c] Bourrit, Description des Alpes Pennines, &c. Ebel, Itinéraire, ii. 26.

[d] Donati, quoted by Saussure, Voyages, sect. 493.

[e] Sept. 3, 1808, at 5 o'clock P. M., a projection of the Rossberg, (Switz.) on the S. W., called the Spitzberg, (2000 feet above the lake at its foot,) fell suddenly, and overwhelmed three entire villages, and parts of two others, in the valley of Goldau, between the lakes of Zug and Lowertz. The latter lake was partly filled up, and a destructive inundation occasioned in its waters. A great part of the inhabitants of the destroyed villages perished in their ruins. The strata of the mountain were inclined to the S. W. and consisted of limestone and puddingstone. There had been previously, long continued, heavy rains, particularly on the 1st and 2d of Sept. The whole mass appeared to slide at once from its place, and broke as it fell.—P.

ceased, and this moving mass of earth was arrested in its progress.[a] A still more astonishing fact of this kind is related: a part of the mountain *Goima*, in the Venetian State, detached itself during the night, and glided along, with several houses, which were carried into the neighbouring valley; in the morning the inhabitants, who had felt nothing, were extremely astonished, when they awoke, to see themselves at the bottom of a valley, and for a long time imagined that a supernatural power had transported them through the air into some distant climate, until, upon examining the environs, they perceived the traces of the revolution which had so wonderfully spared them.

Various disasters are often connected together: inundations originate from the fall of masses of earth, and occasion such falls in their turn.

In 1772, the mountain of Piz, in the March of Treviso, in the State of Venice, was cleft in two; a part was overturned, and covered three villages, together with their inhabitants. A rivulet, stopped by the rubbish, in three months formed a lake. The remaining part of the mountain precipitated itself on that side, the lake overflowed its banks, and many people perished. Several villages were also buried under the waters.[b]

This brief sketch is sufficient to show the difference that exists between a subsiding or falling down, and a shaking of the earth, or earthquake, catastrophes too often confounded by the ancients, and even now by the vulgar. The effects are often the same, but the mode of action and the causes are different. There are fallings down without volcanic shocks, but these shocks often occasion them. The only point of necessary coincidence is, that great rains, which succeed great droughts, equally bring on subsidings and earthquakes. They occasion earthquakes, by evolving in the bosom of the earth elastic and inflammable gases; and they occasion the fall of large masses by cracking, softening, and detaching the different strata of the mountains. The ancients imagined that they could prevent earthquakes, by digging in the towns and surrounding country, ditches and deep wells, to give vent to the subterraneous vapours. It is more certain that men may, with a little care, avoid the destructive effects of fallings down. At first, in choosing the site of a town, or of a village, we ought to take the level of the neighbouring heights, and examine the nature of the rocks, whether they are solid and durable, or the contrary; it is then, generally speaking, easy to place the buildings beyond the reach of such accidents. A Greek naturalist foretold to the Spartans the fall of a projecting part of Mount Taygetus, which soon after overwhelmed in ruins a considerable portion of the city of Lacedemon. Canals and drains, to carry off from the mountains their superabundant waters; reservoirs, where these waters may be collected for distribution over the country, to irrigate the fields and to drive machinery; dikes, walls, and perhaps deep ditches, to stop and weaken the shocks of avalanches; these are the barriers which human industry can oppose to such alarming and disastrous occurrences, one of the most salutary effects of which is to awaken our dormant powers, and to heighten our courage, by giving scope for its exercise.

In tracing out terrestrial hydrography, we have already noticed the very considerable force of running water; and the precipitation of parts of mountains, which we have just been describing, serves to exemplify some of its effects. Its action is still more general; the wandering torrents which roll down rocks, and root up forests, the deep stream which gradually undermines the mountains at whose base it flows, the vast and powerful river which shifts at pleasure the place of its bed, and sometimes creates, by the matter it deposits, a Delta of Egypt, and sometimes, by swallowing up extensive districts, forms new lakes, as, for example, the Lake Biesbosch in Holland; these are the powers which, set in motion by the hand of nature herself, in whose operations ages are accounted as moments, have been able to produce a very great proportion of the changes which the secondary and tertiary soils have undergone.

We shall now produce some examples of very singular changes, arising solely from the action of running water. Upon Mount *Limur*, in Norway, we see two channels worn in a rock of marble, the one above the other. The marble itself which separates them, and which is only three inches thick, allows you to perceive, through its clefts, a river flowing in the lower channel. It appears that the waters of a lake, situate some hundred feet higher, have by degrees hollowed out for themselves these two openings through the rock. It was thus, that the river Gaulen, in the same country, disappeared in 1344, and re-appeared some years afterwards with extreme violence, driving before it the ruins of the subterraneous prison into which it had descended.[c]

Mount Jura, and in general all calcareous mountains, present facts of the same kind. The lake of Joux, and that of Grand-Vaux, and many others, have worn in the rock the funnels through which their waters flow. Sometimes, when the sides of the passage which the waters had made for themselves, become in part worn away and excavated, the roof falls down; it then forms an outlet, cut perpendicularly, through which the waters escape as near Orgelet, on the road to St. Claude;[d] or the mouth of the valley, blocked up by the rubbish, forces the waters to give birth to a lake, such as that of Sillan, near Nantua.[e]

Another singular phenomenon occurs in the funnels with no outlet, called in Sweden *Giants' Cauldrons*. These are circular excavations, sometimes of a spiral form, having their sides very smooth, situate for the most part on the sides of mountains, and frequently containing in the centre a rounded stone. The traveller Kalm observed these hollows in the United States, near Fort Nicholson. Several examples, observed in Switzerland and in Siberia, might be mentioned, but they are there to be met with only in sulphated calcareous rock:[f g] on the contrary, those of Sweden and the United States exist in granite. According to Bergmann, they have been formed by running waters, which had become ingulphed

[a] Delamétherie, Théorie de la Terre, vol. v. sect. 1420.
[b] Geography of Gaspari, (in German,) vol. I. p. 370.
[c] Pontoppidan, Natural History of Norway.
[d] Bertrand, Nouv. Principes de Géologie, p. 175
[e] Ibid. p. 178. Comp. Saussure, Voyages, sect. 384.
[f] Patrin, Histoire Naturelle des Minéraux, iii. 201. Saussure, Voyages, sect. 1238.
[g] Sulphate of lime, gypsum

there, and had imparted a rotatory motion to a stone detached from a neighbouring rock.[a]

In admitting this explanation, the giants' cauldrons would incontestibly prove, that there was a time when the granite was not harder than common limestone or gypsum.[b]

There are many lakes which hold in solution saline, earthy, metallic, and bituminous substances: these substances form sometimes simple deposits; at other times, they are thrown down to the bottom of the lake, by chemical precipitation. Several causes may here concur. The different gases and acids with which the waters of these lakes are charged, may give rise to crystallizations; a cooling in lakes which possess a certain degree of heat, may also have the same effect. It is certain, that the remains of the beings that live and die in these waters, form beds of calcareous earth. Trees and vegetables, which are carried along by the waters, form floating islands, which, by degrees, unite together, and either cover the lakes with a crust of earth, or, by sinking, raise up the bottom. We must add, that the more a stagnant mass of water loses in depth, the more it evaporates; for the evaporation of water is always in the direct ratio of its surface, and in the inverse ratio of its depth, as experiments have proved. There are in all mountainous and marshy countries numerous instances of small lakes which have been dried up by one of these causes; we may therefore safely infer, that the same phenomena have taken place upon a larger scale, and that the formation of several extensive plains is to be ascribed to the drying up of inland seas, or great lakes; as for example, part of those which border on the Caspian Sea.[c]

The filling up of a lake commences by diminishing its basin, but the lake always receiving the same quantity of water, it necessarily overflows, and if it happens to discharge itself into other inferior lakes, it may produce successive overflowings, which change the surface of the surrounding country. These efforts would be more violent if several frozen and swollen lakes should break up and overflow simultaneously. The waters in this case would perhaps be impelled by so impetuous a force, as to overthrow every thing they met with in their course, and make large excavations in the chains of mountains, and thus form great valleys. This idea was developed by Sulzer, and carried to extremes by Lamanon.[d] It occurs very naturally, when one considers the great lakes of North America, which flow into one another, and finally into the river Saint Lawrence. If the soil which borders the Ohio, and where we find the bones of the mammoth, is impregnated with salt; if the plain which surrounds the river of the Amazons, is, as is said, entirely composed of soft earth, without any stones; if we find in the plain of Crau and in Dauphiny the same pebbles and rounded flints, as upon the borders of the lake of Geneva; all these circumstances may be accounted for on the supposition of the overflowing of the interior lakes;—but historical certainty is wanting, and will always be wanting, to these hypotheses. It is, besides, very certain, that valleys must have existed before the flowing of the waters could take place. All, therefore, which can be conceded to this theory of the excavation of the earth by currents of water, must be limited to effects which regard only the superficial strata.

We come to a question which has greatly engaged the attention of physical geographers: the diminution of the waters of the sea.

Let us begin by defining the subject of inquiry. We have nothing to do with those marine or other fluids, which at different epochs covered the globe, and in which lived innumerable shell fishes, madrepores, and polypuses, which we have seen upon the summits of the highest mountains. It is plain that these fluids have disappeared; but the slow or rapid manner of this disappearance, and its internal or external causes, can be known to us only by conjecture. Man existed not at the time of those revolutions which have heaped up on one another the remains of sea, and of fresh water animals. The question is only concerning changes which the sea of the terrestrial globe may have undergone since the last revolution, which has created our existing continents. To the question thus limited an answer may be given.

A very long experience, that of more than twenty centuries, enlightened by the torch of history, seems to prove that the present sea, considered as to its entire quantity, is in a state completely stationary, so that the evaporation of its waters is equal to the quantity with which the rivers augment it, and its extent is neither diminished nor enlarged. But local circumstances, as for example the clearing of waste land, the destruction of forests, the choking up, or the clearing away of the channels of rivers, may for a certain time alter the level of some interior seas. Other temporary or local causes may produce in the same ocean, not an augmentation or diminution of volume, but small oscillations, which, by subverting the equilibrium of the waters, occasion on one side little retirings of the sea, consequently the formation of new ground; and, on the other side, little invasions of the sea upon the earth: these changes mutually compensate each other, and are too limited, and too variable, to have any sensible influence upon the form of great continents.

The present sea endeavours in two ways to change the form of its banks: it creates new lands by depositing sand, gravel, shells, and marine plants; by casting up and retaining the mud, and other substances brought down by the rivers; by undermining the mountains which border it, which causes them at last to fall; by retiring of itself, either because the rivers bring to it a diminished supply of water, or, because on another side, it has overflowed some ground over which it has spread a part of its waters. It has invaded the ancient shores, by washing them away, or by rising above their level, when from any cause whatever, its basin has been elsewhere confined. The seas of Europe, being the best known, will furnish the best proofs of our assertions. Let us begin with the Mediterranean.

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[a] Bergmann, Géog. Phys. ii. 228.

[b] These holes or cauldrons are not uncommon in the U. States, particularly in granite. They are obviously formed by the friction of stones driven round by eddies of water, and are apparently forming continually in this way. There is therefore no need of supposing the granite ever to have been softer than it is now.—P.

[c] Delamétherie, Théorie de la Terre, sect. 1417.

[d] Lamanon, Journal de Physique, 1780. December, p. 474.

We have seen, that by taking in Homer the word *Egyptos* for the name of the river, and not for that of the country,[a] we may dispense with admitting, that the sea has filled up the supposed ancient gulf, which penetrated into Egypt as far as Thebes, and which separated by one day's navigation the island of Pharos from the mainland, as has been commonly affirmed. Some less considerable additions have, without doubt, been made to the land since the time when Herodotus gave us the first description of the country; but these are owing, less to the mud which the river carries down, than to the winds which bring with them the sands of the neighbouring deserts. This is what daily happens upon the coasts of Egypt. The port of Alexandria is obstructed; the town of Damietta, whose walls, in the time of Louis IX. were washed by the sea, is now at a considerable distance from it. As a kind of compensation, lake Menzaleh appears to be formed, either by the overflowing of a branch of the Nile, the cleaning of which has been neglected, or by an irruption of the sea.[b]

Along the eastern coasts of the Mediterranean and its gulfs, there is but little increase of the land. The island of Tyre, however, has been united to the continent by a more powerful hand than that of Alexander. At the mouth of the river Pyramus in Cilicia, a deposite of sand has extended the modern coast six miles beyond the ancient; and similar effects have taken place at other points on the southern shore of Asia Minor, where the coast is flat.[c] The Meander has, by little and little, filled up the valley in which it flows, and which was formerly a gulf. The inhabitants of Miletus, and of Ephesus, have several times changed the situation of their towns, by following the sea, which retired from their walls. On the coast of Greece, a great many small islands, situated in front of the openings of the rivers, are joined to the mainland.[d]

In the gulf of Venice, very remarkable changes have taken place. Ramazzini having observed that all the country round Modena is suspended over a subterraneous lake, and that a great number of shells are to be found there, is persuaded that Lombardy has, in a great measure, been formed by the combined deposites of the Po, and of the sea. All that is certain is, that the Po in former times committed great ravages, by inundating often whole provinces: it has been confined by strong dikes, but by renewing from time to time these embankments, which preserve the country from total submersion, the bed of the river has been elevated, so that the level of the waters of the Po is now raised several feet above the lands which surround it.

The environs of Ravenna, Aquileia, and Venice, present facts more uniform and better established. There is no doubt, according to the observations of Manfredi,[e] that the ground near Ravenna has sunk to such a degree, that the pavement of the cathedral is only six inches above the level of high water; but, at the same time, the land is extended in such a manner that this town, formerly situate in the midst of marshes, and lagoons, and furnished with an excellent port,[f] is now three Italian miles distant from the sea, and surrounded by meadows and fields. The Venetians are very much afraid of seeing their canals dry up, and yet the ground on which Venice stands is a little sunk. Aquileia was once close to the sea. It is alleged that the sea, on the other hand, makes encroachments upon the coasts of Istria and Dalmatia. Columns, and pavements in Mosaic, and urns, are there found under the waters.

The western coast of Italy presents within a small space two phenomena of contradictory appearance. The Pontine marshes now cover part of the *Appian Way*, whilst in the mouth even of the Tiber, we perceive land which was not there in the time of the ancient Romans. It is not, however, the sea which has covered the Appian Way, but the rivers, which the negligence of the modern inhabitants has suffered to be choked up at their mouth. In the same way, if the renowned villas of the ancient Baiæ are now found buried beneath the water, the reason is that these edifices, once the abodes of luxury and ostentation, were built at the first in the midst of the sea.[g]

Upon the coasts of Spain and of France, the Mediterranean has receded. Aigues-Mortes, in Languedoc, was, in the thirteenth century, close to the sea, but at present it is two leagues distant.[h] From the mouth of the Rhone to Agde, the sea has lost ground, or has retired. The port of Barcelona becomes every day less deep. Thus, without entering into a longer detail, we may say that the sum of the known additions made to the land on the shores of the Mediterranean, appears to be more considerable than the sum of the encroachments of the water. But, on the one hand, we are totally unable to compare the ancient and modern states of the coasts of Africa; and, on the other hand, there are upon the Mediterranean a vast number of celebrated harbours, which preserve exactly the same level of waters as in the time of the ancients. Marseilles, Genoa, Syracuse, Navarin, or Pylos, and twenty other places, are found in the same situation. The ruins of Herculaneum touch the sea, so did the town itself in the time of Strabo; there is, therefore, no reason for supposing a general diminution.

The Atlantic Ocean has made some additions to the land upon the coasts of France, and has contributed to raise the level of those sandy plains[i] which reach from Bourdeaux to Bayonne; several bays have been filled up, and the Adour has been obliged to seek a new opening into the sea. A district between La Rochelle, and Luçon, and in general all the *marshes of La Vendée*, have been gained from the sea.[k] The small bay where Mount St. Michael is situate, between Bretagne and Normandy, appears to be equally drying up; but near Dol the sea has resumed possession of those lands which had formerly belonged to it.

Varenius, Lulof, and other geographers, have described the quantities of soil left by the German ocean

[a] See the description of Egypt in a subsequent volume; also Hist. de la Géog. v. I. liv. ii. p. 41.
[b] Shaw's Travels, vol. ii. p. 173, 188. Telliamed, (De Maillet) sur la diminution de la mer, &c.
[c] Beaufort's Account of Caramania, p. 298.
[d] Strabo, lib. ii. passim. Plin. Nat. Hist. ii. cap. 89.
[e] Manfredi De Auctâ Maris Altitudine, in Opusc. Bononiens. ii. 120.
[f] Bianchi, Specim. æstus Marini. Moro, des Changemens de la terre, ii. ch. 25.
[g] See Peintures d'Herculaneum, tom. iii.
[h] Strabo, V. 246, edit. Almelov.
[i] "Landes."
[k] La Bretonnière, Statistique de la Vendée.

upon the coasts of Holland. A number of effects of different kinds are visible here, which all tend to the same result; and we see, above all, a striking example of those changes to which the action of the sea upon the land appears to be subject. In the remotest periods to which history extends, these countries were immense marshes, for which the sea and the rivers contended together. The first deposited sand, the second mud: thus were formed the more elevated grounds which were in some measure habitable. These grounds, however, being sometimes covered with water, and sometimes left dry, belonged equally to both elements. Human industry gave a steady direction to the wandering course of the rivers, checked the fury of the waves by immense dykes, and thus created a country even in the bosom of the waters. But there remained lakes, bogs, and marshes: the rivers silently undermined these ill-consolidated grounds; the sea invaded them through the large openings of the rivers. Several great tides were the epochs of dreadful disasters, of which the following are the most remarkable.

The *Zuyderzee* was anciently nothing but a lake of trifling extent, which flowed into the sea by the river Ulie,[a] (the *Flevo* of Tacitus, and considered as a branch of the Rhine.) About the year 1250, the sea made an irruption into it. Vast tracts of land, which the running waters apparently had undermined, gave way, and thus the Zuyderzee was formed. The gulf of *Dollart*, between East Friesland and the province of Groningen, was, in 1300, a fertile canton, covered with delightful meadows. In 1421, the united force of the sea and of the rivers, destroyed, near Dort, 72 considerable villages, with 100,000 of the inhabitants, (as it is said,) and formed the lake of *Biesbosch*.[b]

The Danish coasts of Sleswick and Holstein present a spectacle nearly similar. There the sea has both lost and gained. The island of *Nordstrand* was swallowed up in 1634; that of *Heligoland* sustained great damage, in the 13th century. On the other hand, the sea brings to the shores of the main land a great quantity of greasy mud, bluish clay, and sand; and when these substances have acquired some consistency, the ground is enclosed with dykes. The soil thus formed becomes so fertile, that in a very few years it indemnifies the cultivators for all their outlay. Upon the coasts of Jutland, in the district of Thy, the sea has filled up with sand several gulfs, which once afforded retreats to pirates, according to the ancient history of the north; and it has probably formed the isthmus that now separates it from the gulf of *Limfiord*, which seems to have been formerly a strait. All the western and northern coast of Jutland, (from 55 degrees 24 minutes, to Cape Skagen, 57 degrees and about 40 minutes,) appears to owe its formation to the sea, which by accumulating sand, has made an unbroken coast of what was once a chain of islands.

The inconsiderable changes which have taken place in the Baltic, by no means prove a general diminution of the waters of that sea.[c] Naturalists have considered the shells and other remains of animals, as evidences of this general diminution; while historians have endeavured to prove it by the filling up of ancient harbours and straits. These two arguments evidently relate to two different epochs. We have seen that all the remains of animals belong to an age when man did not exist. As to the records of history, which, with regard to Sweden, commenced only with the 9th century, there have been upon some coasts of Sweden, accumulations of sand and gravel, particularly among those labyrinths of rocks by which it is in a great measure surrounded. These accumulations are owing to the violence of the currents, which at the same time are very variable; but the gains and losses of this sea compensate each other. If the strait opposite Swedish Pomerania is filling up towards the north, it becomes every day deeper towards the east. In general, we should say with Browallius,[d] that if a thousand observations proved the diminution of the waters, one single observation of the contrary, would be sufficient to reduce these observations to the limits of a local fact. But there is not one: there are a hundred contrary observations, which prove that there has been no general depression in the level of the Baltic sea. Oaks of the age of three centuries, growing on low lands close to the sea; castles which have existed for ages in places which, according to the hypothesis of Celsius, must have but lately arisen from under the waters,—these are the facts which have been triumphantly opposed to the computed results of the advocates of desiccation. Browallius points out a number of places even upon the Swedish coasts, where the sea has become deeper. I should add, that the German geographers assert the same thing, in general, as far as relates to the German coasts of that sea.

The historical arguments in favour of the diminution of the waters of the Baltic, have been equally overthrown. Some have insisted upon the vague language of Grecian and Roman geographers, who represent Scandinavia as a large island; but if the sea had, since the time of Pliny, sunk sufficiently to make the soil of Finland, elevated from 500 to 1000 feet, emerge from under the waters, it would then follow that Mecklenburgh, Holstein, the wastes of Hanover and of Westphalia, and the island of Batavia, now called Betuwe, grounds elevated only from 2 to 400 feet, must have been equally under water. It is, however, certain that the Roman armies carried on war there, and that Ptolemy, at the commencement of the second century, describes those regions in such a manner, that we recognise their existing forms with very few changes.

The charts of the middle age prove nothing in favour of the diminution of the waters. In the convent of St. Michael de Murano at Venice, there is preserved a map of the world, which was made by one of the monks, whose name was *Mauro*. This chart had been made with the assistance furnished by a person called P. Quirini, who, in 1431, had sailed to Trondheim, and from thence had traversed Sweden by land. The Baltic is

[a] The *Vlie Stroom* (channel) is said to correspond with the ancient outlet of the Flevo.—P.

[b] Lulof, Introduction à la Géographie Physique, en Hollandais, § 432, *sqq*.

[c] Linnæus, de Telluris Habitabilis incremento. Amœnit. Acad ii. 430. Id. Voyage de Westrogothie, d'Aeland, de Scanie, &c. Ol. Celsius, Observat. Acad. scienc. Suec. 1743, p. 33. Dalin, Hist. de la Suède, préface. Bergmann, Géographie Physique, 5e section, chap. iii. Ferner, Discours contenant l'Histoire de la Dispute sur la Diminution des Eaux.

[d] Browallius, Recherches Physiques et Historiques sur la prétendue Diminution des Eaux, &c. Stockholm, 1756.

there seen to be more extensive than it is now. But who does not know that upon all the old charts, unskilful designers and engravers have rounded the capes, contracted or extended the islands, and marked out the seas according to their own fancy? How can we allow so great authority to *general* maps, constructed in ages in which there was not one *special* map projected with any care?

The decisive argument in favour of the stationary condition of the Baltic, for twenty centuries, is the identity of so many names of provinces and districts, known in the ancient history of the north, with those which are still applied to the same places; the resemblance of the country as it now exists, with that which we read of in ancient history; the ancient celebrity, in Scandinavia, of countries which could not even have existed, if we admit the hypothesis of Celsius, and the absolute silence of popular traditions, and of ancient Scaldic poetry, which would not have failed to preserve some brief recollections of so great and so memorable a change. In short, if the Baltic sea has diminished, such an occurrence must be referred to those remote periods, involved in the obscurity of ages, when perhaps some very great catastrophe caused a general drying of the ocean, which covered a great part of the earth. But if such a change has taken place, it is certainly an event altogether unconnected with the order of nature under which we live, and with a successive diminution of the present sea.[a]

A less bold hypothesis may be proposed with regard to the Baltic sea. We may attribute solely to the clearing of Finland, and some extensive Russian provinces, as well as to the successive destruction of forests in the north, a successive diminution in the quantity of river water flowing into the Baltic sea; consequently this sea, once a little more elevated than the northern sea, and that of the ocean, will have sunk to the general level of other seas. Not only does the clearing of the ground sometimes diminish, and at other times increase, the quantity of running water in a country, but it also changes the atmospherical constitution; it renders it, generally speaking, warmer, consequently it augments the evaporation which daily takes place at the surface of the waters. We think that this explanation will be sufficient to account for all the changes which are observed in the level of inland seas.

We have seen the effects produced by the Baltic sea: we have seen the island of Hveen, the celebrated residence of Tycho Brahe, diminished by the violence of the waves; whilst a few leagues from thence, near the southern point of Scania, an island is formed, composed of sand: some grass having taken root there, has raised and consolidated it; and it increases every year, without any sinking of the neighbouring sea. The straits through which lakes and inland seas discharge themselves, may be compared to large rivers, which often experience local changes upon their banks.

The frost contributes to elevate certain parts of the Baltic coast. When the lakes and large rivers are frozen, the porous earth which borders them, forms, with the neighbouring water, one single mass of ice. If now, waters which are not frozen, happen to join the mass also not frozen, of either lakes or rivers, the crust of ice must be raised, and the frozen earth must be raised along with it; the void which is formed below these raised masses is filled by mud and gravel from the bottom of the lakes and rivers. Thus after the thaw, the porous earth is left lying on a more elevated level than it had at first. These facts may be observed every year in East Bothnia.[b] The marine ice, suddenly broken by some oscillation of the sea, lifts up whole rocks, and carries them further upon the land. In Sweden, there are two rocks which owe to this cause a more elevated position than they once had.[c]

Kalm, who has made such accurate observations on North America, says, that there are considerable additions made to the land in the province of New Jersey, along the rivers, but he attributes them to the clearing of the country. Uncultivated ground covered with rocks, moss, and briers, is proof against the influence of running water; whilst cultivated land presents to the action of the water a surface rendered moveable by the plough, and decomposed by the air and the sun, the small and light particles of which are easily carried along by the waters. This observation appears to us to be very correct, and perfectly conformable to what we see in the north, especially in clayey and muddy ground.[d]

It is useless to enter into a minute detail concerning other quarters of the world. The augmentations of soil along the *Tehama* in Arabia, and the alleged submersion of the *Bridge of Adam*, which, it is said, joined the island of Ceylon to India, would furnish us with a decided contrast. From the *Voyage of Nearchus* we should learn, that notwithstanding the immense tides, the coasts at the mouth of the Indus have not been sensibly changed since the time of Alexander. Were we to believe the Chinese annals, we should on the other hand have clear proofs of the progressive desiccation of the globe. But the coasts on the north-west of America, would present us with traces of the encroachments of the ocean. In short, all the facts that have been collected, when carefully examined and carefully weighed, bring us to no other conclusion than this—that the *existing sea is completely stationary*, and that its level falls and rises from local and temporary causes, without any change in its general volume.

If, notwithstanding this historical truth, we find, on the continents, and even at a considerable height, anchors and wrecks of vessels, we can explain these phenomena by admitting a tradition recorded in the inspired pages of Moses, and ably defended by Deluc. When the soil of our present continents formed the bottom of the ocean, there existed another continent peopled with inhabitants; a continent which disappeared in consequence of a great catastrophe, which at the same time left dry the existing habitable earth. The antediluvians, therefore, navigated above the level of our present fields: they pursued the whale where we now

[a] Bring (since named Lagerbring) de Fundamentis Chronologiæ Sueo-Gothicæ, p. 48, 50, 55, 73, 76. Rhyzelius, Episcopia Sueo-Gothica, ii. 148. Suhm, Esquisse de l'Origine des Peuples, p. 11, &c.

[b] Bergmann, Géographie Physique, ii. 244, *sqq.*

[c] Runeberg, Dissertation, &c. Mém. de l'Académie de Stockholm, 1765.

[d] Kalm, quoted by Browallius, § 108.

reap our harvest; they cast anchor upon our mountains, which were then rocks and islands in the bosom of the sea, Whatever may be the fate of this hypothesis, Deluc has clearly shown that these ancient wrecks cannot establish a progressive diminution of the existing sea.[a]

Let us now contemplate the ravages of another element. The name of *volcano*, taken from that which the Romans gave to the God of Fire, now designates those mountains which vomit forth flames, smoke, and torrents of melted matter. The chimney through which the smoke and melted matter issue, terminates above in a vast cavity in the form of a truncated and inverted cone. This mouth of the volcano is termed the crater.

The eruption of a volcano is a most frightful and most majestic phenomenon. The signs which are the forerunners of the explosion, announce that the invisible combat of the enraged elements has already commenced. These are, violent movements which shake the earth afar off, prolonged bellowings, subterranean thunders, which roll in the sides of the agitated mountain. Very soon the smoke, which is almost continually emitted from the mouth of the volcano, increases, thickens, and ascends, under the form of a black column. The summit of this column, yielding to its own weight, sinks down, becomes rounded, and presents itself under the appearance of the head of a pine tree, having the lower part for its trunk. This hideous tree does not long remain immoveable: the winds agitate its blackened mass, and disperse it in branches, which form so many trains of clouds. At other times the scene opens with more brilliancy. A jet of flame rises behind a collection of clouds, keeps immoveable for some time, and then appears like a pillar of fire which rests upon the ground, and threatens to set the sky in a blaze. A black smoke environs it, and from time to time intercepts the dazzling brightness. Numerous lightnings appear to flash from the midst of the burning mass. On a sudden, the brilliant cascade seems to fall back into the crater, and its fearful splendour is succeeded by profound darkness. The effervescence, however, goes on in the interior abysses of the mountain; ashes, dross, and burning stones, are projected in diverging lines, like the spouts of fireworks, and fall around the mouth of the volcano. Enormous fragments of rocks appear to be heaved against the skies by the arms of the new Titans. A torrent of water is often thrown out with impetuosity, and rolls hissing, over the inflamed rocks. There is then raised from the bottom of the crater a liquid and burning matter, similar to metal when in fusion. This fills the whole of the crater, and reaches to the very edges of the opening. An abundant quantity of dross floats on its surface, which alternately appears and vanishes as the liquid mass rises or falls in the crater where it seems to boil. This scene, of so majestic a character, is but the prelude of real disasters. The liquid matter overflows, runs down the sides of the volcano, and descends to its base. There it sometimes stops, and appears like a fiery serpent recoiling upon itself. More frequently it dilates itself, and gushes out from beneath a kind of solid crust which is formed upon its surface: it advances like a wide and impetuous river, destroys whatever it meets with in its course, flows over those obstacles which it cannot overturn, passes above the ramparts of the shaken cities, invades a space of country of several leagues in extent, and transforms in a moment flourishing fields into a burning flame. Equal ravages may be sustained, though the liquid matter called *lava*, does not issue exactly from the top of the volcano: it is sometimes too compact and too weighty to be elevated to the summit; its violent efforts then occasion new ruptures in the sides of the mountain, through which the igneous torrent rushes out.[b]

A great chain of ignivomous mountains stretches around the great ocean. Terra del Fuego, Chili, Peru, all the chain of the Andes, are full of volcanos. We distinguish in Peru, those of Arequipa and of Pichincha; and that of Cotopaxi, whose flames, in 1738, rose higher than 2000 feet, and whose explosion was heard at the distance of 120 leagues, if we may give credit to the Spaniards. *Chimborazo*, the highest mountain of the globe, is an extinguished volcano; and there are a great many others. Smoke was seen, by Humboldt, to issue from Antisana, at an elevation of 18,120 feet.[c] If we pass the isthmus of Panama, we find the volcanos of Nicaragua and of Guatimala. Their number is infinite: there are some which are covered with perpetual snow, and which consequently are elevated to a great height. Then come those of Mexico, properly so called; namely, Orizaba, Popocatepetl, 16,626 feet high; Jorullo, which first broke out in 1759, and several others, all situate under the 19th parallel of latitude.[d] California contains five volcanos, that are now burning. There can be no doubt, according to the accounts of Cook, La Perouse, and Malaspina, that there is a number of very considerable volcanos on the north-west of America. Mount Saint Elias is nearly 16,800 feet in height; these volcanoes form the intermediate link between those of Mexico and those in the Aleutian islands, and the peninsula of Alashka. These last, which are very numerous, both extinct and burning,[e] serve to continue the chain towards Kamtchatka, where there are three of great violence. Japan has eight; and the island of Formosa has several. The volcanic belt now becomes immensely wide, and embraces the Philippine islands, the Marian or Ladrones, the Moluccas, Java, Sumatra, the isles of Queen Charlotte, the New Hebrides, and, in short, all that vast Archipelago which forms the fifth part of the globe. These volcanos will be particularly noticed when we describe in detail those islands in which they are found.

The other volcanic chains are far from being of so great extent. There is perhaps one in the Indian Sea. The islands of Saint Paul and Amsterdam, the formidable volcano in the island of Bourbon, and the jets of hot water in the island of Madagascar, are the only known links of this chain.

The gulf of Arabia flows at the base of the volcano

[a] Deluc, Lettres Physiques et Morales, ii. Lettres 89 et 90.

[b] Plin. jun. Epist. lib. ii. p. 16. Pindar. Pyth. I. v. 35—50; Virg. Eneid. III. v. 571—582. Claud. Rapt. Proserp. I. v. 151—176. Della Torre, Histoire du Vésuve, en Italien. Hamilton, Lettres sur les Eruptions du Vésuve. Dolomieu, Mémoires sur les îles Ponces; Id. Voyage aux îles Lipari, &c. &c.

[c] Humboldt, Tableau des Régions Equatoréales, p. 124.

[d] Humboldt, Essai sur le Mexique, liv. iii. ch. viii. p. 253.

[e] Gmelin, Description de la Russie, i. 258.

of *Gebel-Tar*. The neighbourhood of the Dead Sea, and the whole chain of mountains which runs through Syria, have been the theatre of volcanic eruptions. We may be allowed to connect these two facts.

A vast volcanic zone occupies Greece, Italy, Germany, and France. The celebrated revolutions of the Grecian Archipelago, and those new islands produced by submarine explosions are well known. The summits of Mount Etna are next descried; this mountain has burnt for 3300 years,[a] and it is surrounded by extinguished volcanos which appear much more ancient. The islands of Lipari seem to owe their origin to the volcanos which they contain. Vesuvius has not always been the only ignivomous mountain in the kingdom of Naples, another still larger, but extinguished, has been discovered near Rocca Fina.[b] The Solfatara is ranked under the same class. The Ponce islands, or island of Ponza, are of volcanic origin; the catacombs of Rome are excavations from the lava. Tuscany abounds in hot and sulphureous springs, and other indications of volcanos. Arduini observed in the environs of Padua, Verona, and Vicenza, a great number of extinguished volcanos. Dalmatia has several. It was long suspected that a district in Hungary nourished subterraneous fires in its bosom; the eruption of a volcano has recently evinced the truth of the conjecture.[c] Germany contains a great number of extinguished volcanos; the best known of which are those of Kamberg in Bohemia, Transberg, near Gottingen, and those near Bonn and Andernach, upon the borders of the Rhine. The southern part of France is full of extinguished volcanos, among which Mount Cantal, the Puy-de-Dome, and Mount d'Or in Auvergne, are the most conspicuous.[d]

The Western is not like the Great Ocean, encircled by a chain of ignivomous mountains, but it contains in its bosom several groups. If the principality of Wales, the island of Staffa, and some parts of Scotland and Ireland, exhibit only equivocal proofs of the existence of extinguished volcanos, Iceland presents to our view its Hecla, its Kotlouguia, and several other volcanos, which rise from the midst of perpetual snow. This volcanic focus is one of the most active on the globe; the very bottom of the ocean is, in these regions, agitated, and the waves often bear along whole fields of pumice stone, or with convulsive throes give birth to new islands. Several circumstances lead us to suppose, that there are some volcanos in the interior of Greenland. That frozen country experiences the shocks of earthquakes.

The middle of the Atlantic Ocean conceals another volcanic focus, of which the Azores and Canary islands have felt the effects. The Peak of Teneriffe, which is 11,400 feet high, is the most elevated volcano in the old world. It is very probable that Lisbon has, in its vicinity, a submarine volcano.

The Antilles probably contain a whole system of volcanos, parts of which are recognised in Jamaica, Guadaloupe, and Grenada.

We may also mention some volcanos, which are detached, or which belong to groups little known. Such are Mount Elburtz in Persia, the extinguished volcanos of Dauria, discovered by Patrin; perhaps some volcanos to the north of China; that which is seen in Fuego, one of the Cape Verd islands, and those which the Portuguese authors point out in Guinea, Congo, and Monomotapa.

It follows from this general survey of volcanos, that they are most numerous in the neighbourhood of the sea, and in islands. Nevertheless, there are many, however, which do not appear to have any communication with the sea. Another general fact is, that the craters of volcanos burst forth in all kinds of rocks, granitic, schistous, argillaceous, primitive or secondary; but there is nothing to throw light upon another question much more interesting, in what species of rock or earth the focus of these immense and awful fires is placed. The solution of this question involves that of the origin of volcanic fire, which has been so long and so keenly agitated.

Rouelle, Desmarets, and other philosophers, attribute the origin of volcanic fire exclusively to the inflammation of bitumen, pit-coal, fossil wood, and turf, or peat. An explanation more generally received has been proposed by Lemery, who ascribed the volcanic phenomena to the spontaneous inflammation of pyrites, and who, by a striking experiment, has rendered this hypothesis highly probable. He formed a mixture of 50 pounds of iron-filings and sulphur, which, after moistening it, he buried in the ground at a certain depth; the mixture became gradually heated, and at last took fire with a great explosion.[e]

Most naturalists combine these two opinions, considering pyrites as the foundation and cause of volcanic fire, while the vast masses of bituminous and carbonaceous schists which are often met with stratified in the same rocks, serve as fuel to the subterranean fire, which becomes extinguished when it can find no more nourishment.[f]

Difficulties, however, still remain. Fragments of granite, which the volcanos project, and which seem to indicate the place of their focus under primitive rock itself; the long period of the activity of certain volcanos; the impossibility that the neighbouring earth could furnish such copious ejections without becoming excavated, and sinking down; the inconceivable force with which heavy masses of matter are projected to immense heights; and, besides the astonishing force, and

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[a] Guénau, see the French part of the Collect. Academ. vol. vi. p. 489.

[b] Scipione Breislack, Topographia Campaniæ; Journal de Physique, l'an viii.

[c] Daubeny and Poulet Scrope, the most recent writers on volcanos, do not even hint at an active or a recent volcano in Hungary, though the latter professes to give an enumeration of all the volcanos, which have been in action within the period of well ascertained history. The appearances, in Hungary, most decidedly volcanic, are several craters near Tashkund (Transylv.) now filled with water, covered over by a thick growth of marsh plants. The hill of Bodoshegy, in that vicinity, is a volcanic cone, from which issue springs and hot sulphureous vapours, but it has not been active within any known period.—P.

[d] Beroldingen, Volcans Anciens et Modernes, considérés physiquement, &c. Manheim, 1791, 2 vols. (in German.)

[e] Mémoires de l'Acad. 1700. This experiment has been repeated in Holland. Journal de Physique, 1794, 5me cahier.

[f] Bergmann, Geographie Physique, ii. 214—220. Pallas, Observ sur les Mont. p. 54. Delamétherie, Theorie de la Terre, §§ 1011—1020.

the sudden explosion, the peculiar nature of volcanic fusion, which rarely produces vitrification, and which appears oftener to digest and concoct than to burn; these are circumstances which have led not a few naturalists, well versed in such observations, to suppose that the reservoirs of volcanos exist at a very great depth, and that their activity is owing to more general causes, such as electricity, or the elastic gases enclosed within the bosom of the globe.[a b] Deluc thinks that the focus of volcanos is in a certain residue of the primitive fluid, in which, according to him, the earth was formed, and that the volcanic fire is of a chemical nature very different from that of all known fires.[c]

We come to a dreadful phenomenon intimately connected with volcanic eruptions—earthquakes, those convulsive movements which shake the surface of the earth, whether in a *horizontal* direction, with undulations similar to those of the sea, or *vertically*, when a part of the ground is raised up, and the other part sinks down as into a gulf, or *circularly*, when ponderous masses of rocks and earth revolve as it were on a pivot. These are the three kinds of motion distinguished by Italian writers who are well acquainted with these phenomena.[d]

Earthquakes produce the most calamitous effects: they often change the surface of a country in such a manner that it is difficult to recognise it. Enormous gaps appear to discover to the eyes of the living the empire of the shades. These fissures emit bluish flames, and deadly vapours; in the course of ages they form new valleys. In other places mountains are swallowed up or overthrown; often detached from one another, they glide along upon the lower ground, and as the force with which they are impelled redoubles at every moment, these ambulatory rocks bound over both valleys and hills. Here the vineyard descends from its height and settles in the midst of fields of corn; there, farms with their gardens, lifted without separating, become attached to distant villages. In one quarter, new lakes are formed in the midst of the earth, in another, rocks hitherto invisible, suddenly rear their wet summits from the bosom of the foaming sea. Springs are dried up, rivers disappear and lose themselves under ground; others, choked up by fragments of rocks, spread out into vast marshes. New springs gush out from the shattered sides of the mountain; incipient rivers struggle with youthful impetuosity, and endeavour to hollow out a channel for themselves amid the ruins of cities, palaces, and temples.

What makes earthquakes still more dreadful is, that there are no signs which unequivocally indicate either their approach or their termination. They happen at all seasons, and under every constitution of the atmosphere. A subterraneous noise indeed is their infallible forerunner; but it is scarcely heard before the earth gives way. Animals, particularly horses, dogs, and fowls, show by their terror a presentiment[e] of its coming. The barometer falls extremely low.

Earthquakes act with astonishing rapidity. It was one single shock which, on the 5th of February, 1783, overthrew Calabria, and destroyed Messina in less than two minutes. But these agitations are sometimes repeated for the space of months and whole years, as in 1755.

The *direction of earthquakes* is one of the most remarkable facts in physical geography. Sometimes we remark a central point where the shocks are most violent, and this centre sometimes changes its place, as if the subterraneous force rebounded from one point to another; sometimes we can distinguish a certain line along which this force seems to move. The sphere of such a revolution seems often to embrace a fourth part of the terrestrial globe. The earthquake which caused such devastations at Lisbon was felt in Greenland, in the East Indies, in Norway, and in Africa. That of 1601 shook all Europe and a part of Asia. In 1803 the shock was felt almost simultaneously at Algiers, in Greece, at Constantinople, Bukarest, Kiow, and Moscow.

No part of the globe appears to be exempted from these terrible effects. The Alps contain no trace of a volcanic agency, and yet they are often shaken by earthquakes.[f] The silver mine at Kongsberg in Norway was first opened up to view by a shock in 1603. Even the frozen zone is subject to earthquakes. Greenland feels frequent shocks; and in 1758 Lapland experienced a violent commotion.

The sea often, but not always, shares in the convulsions of the earth. In 1755, the waters of the Tagus rose suddenly to 30 feet above their ordinary level, and retired immediately with such force, that the middle of the river was observed to be dry. Four minutes afterwards the same phenomenon recurred, and it was three times repeated. Similar motions occurred the same day at Madeira, at Guadaloupe, and at Martinique. In the earthquake which proved destructive to Lima in 1746, the ocean had a movement of the same nature; but, proportionate to the mass of water which was thrown into agitation, it rushed forwards upon the land for a space of several leagues. All the large vessels which were in the port of Callao were swallowed up: all the small craft were driven beyond the town. Navigators assure us, that ships are very often dreadfully tossed by a sud-

[a] Dolomieu, Journal de Physique, an. vi. p. 408. Faujas St. Fond, sur les Volcans du Vivarais, id. Minéralog. des Volcans, id. Essai de Geologie, ii. 402.

[b] The lavas of volcanos generally contain fragments or crystals of the oldest primitive rocks, and sometimes appear to be almost entirely made up of such crystals. Among the ejected fragments are granite, gneiss, argillite, primitive limestone, &c.; and among the unaltered crystals, vesuvian, garnet, mica, feldspar, leucite, augite, hornblende, olivine, &c., all of which are generally found in primitive rocks, which seem to be their natural location. They are generally imbedded in fragments of rocks decidedly primitive. These facts would seem to show that the focus of volcanic fire is in the primitive formations. Although many of the volcanos actually rise from the more recent formations, yet they may have forced their way upward through them, from the lowest primitive. Ætna is nearly in contact with the primitive mountains in the rear of Messina. Vesuvius is not far from the Apennines, the central ridge of which is often occupied by primitive rocks. Lavas have been arranged according to their constituents. Trachytic lavas consist chiefly of dry crystals of feldspar with some mica, &c., scarcely united by a cement. Basaltic lavas have the general characters of basalt, and are distinguished by the minerals they contain, feldspathic, leucitic, augitic, &c. The lavas of Vesuvius are leucitic basalt, of Ætna, feldspathic basalt, of Stromboli, augitic basalt, of Monte Somma and Monte Nuovo, of the Azores, Teneriffe, Chimborazo, and the Leeward Islands, trachytic; the extinct volcanos of Hungary are also trachytic.—P.

[c] Deluc, Lettres à Blumenbach, &c.

[d] Bertrand, sur les tremblemens de la terre. Dolomieu, Mémoires sur le tremblement de la Calabre. Hamilton, &c. &c. Bartels, Lettres sur la Calabre.

[e] Seneca, Quæst. nat. vi. 1, 29.

[f] Collect. Acad. vol. vi. Delamétherie, Theorie de la Terre, § 1057

den and convulsive motion in the sea, very similar to those which shake the land. These agitations of the sea, perhaps take place, though there is no corresponding shaking of the earth. At other times they are the effect of submarine shocks in the very bottom of the ocean.

The causes of these catastrophes are not well ascertained. It appears that there are several concurring causes, of a very different nature. Some slight shocks arise, without doubt, from fallings in of the ground, and subterraneous sinkings, which take place after great droughts. At other times the shocks may be produced by the terrestrial and atmospherical electricity, which seeks to recover its equilibrium. These phenomena, the reality of which can scarcely be contested, depend upon the temporary constitution of the seasons. The most generally received opinion attributes earthquakes to *elastic vapours* enclosed in subterraneous cavities, whether they arise from the abundance of rain collected in the craters of volcanos, or are disengaged from the inflammable substances with which the subterraneous rivers or waters of the sea may come in contact; or, finally, are extricated by the fermentation of that subterraneous fluid, which Deluc supposes to be the residue of the mother waters of the globe. These vapours become dilated by heat, and in seeking an outlet they raise up or shake the earth.[a]

If this last hypothesis be true, as many circumstances lead us to suppose, the Japanese have not been wrong in saying that it is a great submarine dragon which raises up the earth by its breathing. A similar tradition prevails in the mythology of the Scandinavians. It is probably in allusion to this, that Homer has given to Neptune the epithet of *Ennosigaios*, that is, he who shakes the earth.

We have not attempted to diminish the terror which earthquakes invariably inspire, but we must however contradict the framers of systems, who have exaggerated their effects with the view of exhibiting in them the sole cause of the revolutions which have happened on the surface of the globe. There is no example in the records of authentic history, of any considerable district or island having been formed by a volcanic eruption, or by an earthquake; the most considerable heaving up, which is known, is that of the volcanic district of *Jorullo*, in Mexico, which took place in 1759. For the space of half a square league, flames were observed issuing from the plain; fragments of burning rocks were thrown up to a prodigious height; and through a thick cloud of cinders, streaked with volcanic fires, the spectators thought that they saw the softened crust of the earth swelling up. In the midst of the heaved up earth, which is about 500 feet in elevation, several thousands of little volcanic cones arise, sending forth their smoke, and occasioning a subterraneous noise. Among these small volcanos six great ones rear their heads, to the height of about 1500 feet above the ancient level of the plain. Strabo speaks of a piece of ground being raised up near Methone, in Greece, to the height of seven stadia, which, taking the stadium at 1111 to the degree, must have been more than 2200 feet. We are informed of a volcano of considerable elevation in the island of Timor, which sunk entirely down, leaving in its place nothing but a muddy marsh.[b] It follows from these and similar examples, that the ground which has been either elevated or swallowed up by the volcanic force, consists only of those masses of burning or scorified rocks, which form the chimneys of the volcano, and which, when projected from its mouth, almost immediately fall back around the orifice.[c] Even the phenomena of Jorullo accord with this theory. The thousands of little volcanic chimneys, which were forming at the same moment, presented the appearance of a heaving up of the ground.

All that has been said as to islands having been created or swallowed up by volcanos, is reduced then to the simple fact of the existence of submarine volcanos, which sometimes elevate, and sometimes destroy the edges of their crater. We shall elsewhere develope this general observation, when we come to trace the history of the island of Santorin,[d] the best known example that there is of these kinds of revolutions. We may safely conclude, that the islands actually created or destroyed by volcanos can be only of very limited extent, and that the pretended catastrophes of Atlantis and Frislande, of which we have given the true explanation in another part of this work,[e] cannot be ascribed to volcanic eruptions by men accustomed to examination before they believe.

Nearly allied to volcanic convulsions, are *eruptions of mud*, a phenomenon which, from time to time, takes place in volcanos, but which occurs also independently of them, and as the effect of causes peculiar to itself. *Maccaluba*, in Sicily, is the most celebrated among the *terrivomous mountains*, if we may call them so. In its ordinary state, mud, half fluid, is observed to boil up in the craters, or funnels, which terminate each of the small protuberances raised up on this mountain, or rather upon this clayey hill. The mud rises in half globes, and falls down, after having emitted a bubble of air; but there are epochs when, after a great rain, all these small craters disappear, the whole mass of the mountain ferments, subterraneous thunders are heard, and a quantity of mud and stones spouts forth to the height of 200 feet. Not far from Bologna, several quagmires, called the *Salses*, situated in rising grounds, composed of saline and alkaline earths, exhibit, on a small scale, similar phenomena, emitting occasionally smoke and flames.[f] The Crimea and the neighbouring island of Taman, contain several hills, whence issue muddy eruptions. One of them has been seen to dart forth flames. In the same vicinity, and opposite the town of Temruk, an island was raised in the middle of the sea in 1799, which, after having cast forth mud, flames, and smoke, disappeared under the waves. Upon a tongue of land, opposite Taman, there is a hill, called in Tartar *Kouk-Obo*, which in 1794 experienced a terrible explosion. A column of pale red fire shot up from it, to nearly

[a] Deluc, Lettres à Blumenbach, p. 164—184. French edition.
[b] Humboldt, Essai sur la Mexique, 249—258. Beroldingen, Volcans anciens et modernes. I.
[c] Deluc, Traité élémentaire de Géologie, §§ 210—214.
[d] See the Description of Turkey in Europe.
[e] Hist. de la Géog. p. 33, 76—78, 397—460.
[f] Dolomieu, Voyage aux Isles Lipari, *in fine*. Compare Spallanzani's Voyages, v. 222—227, French translation.

300 feet in height, and mud, mixed with bitumen, was projected to the distance of a quarter of a league.[a] The whole projected mass was computed to amount to 100,000 cubic feet; according to Pallas it consisted of a bluish clay.

The *Growing*, or *Increasing Mountains*,[b] which are met with at the foot of Caucasus, near Baku, and near the mouth of the river Kur, belong to the same class. They are produced by springs, which throw out a salt claggy mud; and in this manner hills above 400 feet high are formed.[c] Volcanos themselves throw out, though with greater violence, substances dissolved in water. Those which crown the chain of the Andes, near the city of Quito, emit only a small portion of scoriæ, but an enormous quantity of water and clay, combined with carbon and sulphur.[d] These examples may suffice to show, that the eruption of earthy substances in watery solution, far from being an insulated and unimportant phenomenon, forms even to this day one of the most remarkable sources of the changes which have taken place on the surface of the globe; and that in former ages it probably had a very great influence in the formation of our mountains. We think we may ascribe, if not to the same, at least to a similar cause, the origin of the coagulated rocks known under the name of *Basalt*.

It is thus that all the elements of nature are armed for mutual destruction. What are those revolutions that we behold, in comparison of those which must have operated together in the creation of the world, and which perhaps are one day destined to accomplish its final destruction. May not those stars, those suns without number which guide the mariner in the midst of the pathless deep, be in a moment extinguished? May not this arch of the globe which supports us, give way beneath our feet? Is not the equilibrium of the seas liable to be subverted, and will not the foaming billows one day roll over these continents which are at present covered with the monuments of human industry? May not the earth approach too near to the sun, and be swallowed up by it like a drop in the ocean? May it not wander into those remote and dreary regions of space, where the solar heat is too feeble to support the principle of life? How frightful would it be to exist in the midst of these perfidious elements, in the bosom of this perishable universe, without the consoling thought of a supreme intelligence, that both checks and wields at will the formidable and blind powers of nature? It is only the belief in an order of things superior to matter, in a moral world, that can fortify us against the terrors by which our physical existence is every where assailed.

[a] Pallas, Voyage dans la Russie méridionale.
[b] "Montagnes croissantes"
[c] Lerch, Voyages cités par Georgi, Description de la Russie I. 114.
[d] Humboldt, Tableau des régions équatoreales, 130.

BOOK XIX.

Continuation of the Theory of Geography. View of Geological Systems, or of Opinions regarding the Formation of the Globe.

In the course of this work, we have seen that the physical geographer cannot refrain from connecting together certain facts, which frequently recur, and deducing from them general conclusions. He is even forced sometimes to present facts in a hypothetical manner, because observers have furnished him with their remarks under that form. But physical geography affirms nothing which is not established by experience. Systems of geology, on the contrary, have for their professed object to trace the progress of unknown revolutions, by the assistance of monuments which are often equivocal.

The authors of such systems, in the absence of positive facts, do not scruple to call in the aid of analogy, and thus, by hypothesis after hypothesis, they analyze and recompound the vast globe of the earth, as if it were a piece of metal, which the chemist could fuse in his crucible.

We shall endeavour to prove, that this pretended science, or speculative geology, promises no certain results, since it oversteps the evidence of facts, that is, since it deviates from the sure and beaten paths of physical geography.

In the first place, the portion of the globe which is known to us, does not constitute, at the very utmost, the thousandth part of its entire mass. Our excavations do little more than scratch the surface of the earth; our geologists have surveyed with attention scarcely the half of Europe, or the tenth part of America and Asia; the observations which have been made are extremely few; and yet unbounded scope has been given to speculation. We do not know whether the interior of the globe is composed of substances analagous to those occurring on its surface, or consists solely of a mass of sand; whether it contains within a central fire which continually burns, or a vast reservoir of primitive waters; or whether, finally, the globe is only a hollow sphere, filled with air and vapours. As to these matters, we know nothing whatever, and can by no arguments, astronomical or physical, prove either the truth or the falsity of any of these opinions. In the vast and unexplored recesses of the globe, it is possible that there may lie concealed, agents so active and so powerful, that to them the various revolutions which the earth has undergone, may have been the work only of so many moments.

As long as the interior of the globe remains unknown to us, the conclusions which we may draw from facts observed on the surface, can be no more than probable in reference to these facts; but whenever we attempt to combine the conclusions in order to form a general system, their uncertainty will clearly appear; for, opposite to a finite sum of probabilities, however strong we may suppose them, there shall arise an infinite sum of unknown terms, of which one alone may perhaps be sufficient to counterbalance all our probabilities.

It is in vain to compare geological hypotheses with those made use of in astronomy, natural philosophy, and chemistry. The theory of attraction, for example, is purely and simply a mode of stating a fact furnished by observation; it is a formula for computing the known effects of certain unknown forces, as to the nature of which no opinion is expressed. But the authors of those philosophical poems, improperly called theories of the earth, will not confine themselves to the stating of facts; they have recourse to mere suppositions. But, what is more, even facts in geology, however completely they have been established, cannot be expressed in mathematical terms; they are incapable of being subjected to calculation. We therefore apprehend that chemistry and physics, far from furnishing arms to extend the empire of geology, must, on the contrary, disavow the premature and too general application that has been made of some theoretical principles, of which philosophers and chemists have availed themselves only in questions of doubtful speculation. Philosophy may admit, without complete proof, the existence of a gravitating, a calorific, an electrical, a magnetic, and a galvanic fluid, when it distinctly perceives their effects in a number of carefully conducted experiments; but does it follow from this, that speculative geology, in the absence of such perceived effects, may lay hold of these principles which are still hypothetical, and make use of them as if they were agents perfectly known, and entirely subjected to its power? And if geologists have the candour to own that they know nothing whatever of the part which the different etherial or atmospherical fluids may have acted in the primitive formation of the earth, is not this the same as owning the absolute impossibility of their being able to form a primitive history of the globe? The theory of chemical affinities, or of atomic attractions, has furnished us with some just ideas concerning the primitive formation of solid detached bodies; but as long as the law according to which these attractions decrease, remains unknown, and whilst we neither know the agents nor the processes which nature employs in the greater number of cases, the chemist can impart to us no positive and precise information as to one single operation of the unknown power which has produced, or which sustains, the universe. Still less can he trace the immense chain of its operations, the last link of which is attached to the throne of the Almighty.

The strongest argument against the possibility of a theory of the earth, appears to be suggested by a consideration of that admirable system of *celestial mechanics* whose unalterable laws maintain the globes in their respective positions and their mutual dependence. In this system of the universe, so completely established by astronomy, it is difficult to conceive a derangement of any part, which does not sensibly affect the whole But speculative geology perceives nothing but derangements and convulsions. The changes in the situations of the poles, the augmentation and diminution of the mag-

nitude of the earth, the immense volume of water which held all terrestrial substances in a state of solution, the processes of desiccation and refrigeration, and many other great revolutions which must be assumed in constructing a theory of the earth, could scarcely have taken place without altering the equilibrium established by universal gravitation. Besides, as all the globes of our solar system are evidently bodies subjected to uniform laws, theories of the earth must inevitably degenerate into cosmogonies. Every time that men of genius have engaged in speculations upon the history of our globe, they have found themselves forced to extend their hypotheses, so as to embrace the whole solar system; they have been gradually led on to the discussion of questions altogether beyond the limits of our faculties, such as those concerning the eternity of the world, and the essential properties of matter.

Such are the reasons which seem to us, *a priori*, to prove the impossibility of establishing any general theory regarding the primitive formation of the globe. Let us see whether a review of the various systems hitherto proposed by geologists, will lead us to a different conclusion.

Almost all geological opinions may be reduced to two great classes, the opinions held by the Vulcanists, and those entertained by the Neptunists.

The Vulcanists tell us, that the earth at first was in a state of igneous fusion; that it then gradually cooled, and was covered with water only at a subsequent period. Air and caloric, or fire, were the powers which gave to it its existing shape. The land was heaved up by an internal force; the irregularities which diversify its surface are the effects of volcanic eruptions; and the transported soils have been formed by the disintegration of the higher grounds.

According to the Neptunists, the earth was originally in a state of aqueous and cold solution, at least to a certain depth. Solid bodies were formed by desiccation, precipitation, crystallization, &c. The primitive ocean has retired, or rather has disappeared. Strata have been overturned, in consequence of the land giving way and sinking down from its own weight; the tertiary soils have been formed in the bosom of the waters.

These ideas, more or less extended, varied, and combined, constitute the basis of all the theories of the earth which the industry of Delametherie has been able to collect.[a]

The Egyptians appear to have adopted the Neptunian system. According to them, the waters had covered the whole earth, but were now concealed in the vast cavities which were supposed to exist in the interior of the globe, and from which they were one day destined to issue forth. They maintained, that a great island or continent, called Atlantis, had sunk in the bosom of the sea. It is to Plato that we are indebted for these fragments of the Egyptian system.[b]

It appears that the Hebrews and the Chaldeans held the same opinions as the Egyptians, except that the Chaldeans believed in the existence of a central fluid similar to the atmosphere, and considered the globe as having been twice covered with water—first by the chaotic waters, and then by an universal deluge. This deluge, according to the Chaldeans, was the effect of a change in the axis of the globe, occasioned by an irregular attraction of the superior planets. The Hebrews represent it as the work of omnipotent power.

The most ancient writings of the Hebrews, attributed to their law-giver Moses, have also preserved a most interesting tradition, the vestiges of which are plainly to be traced among many other nations, namely, that of six geogonical epochs, or a successive formation of the globe. If the Hebrews speak of six days, and the Etruscans of six thousand years; if the Indians have extended these epochs to millions of years, this makes no real difference. These expressions, however contradictory they may seem, being only the varied phraseology in which the ancient poets and prophets so frequently indulge.

Deluc, whose faith in Christianity cannot be suspected, has never been able to explain the geogonical system of Moses, otherwise than by taking the word days in a figurative sense, for some indefinite period of time. Every theologian knows, that to explain the Hebrew prophets, and particularly Daniel, recourse must be had to a similar method of interpretation.[c]

It is obvious, that these Neptunian systems have had their origin in *new countries*, which have been formed by the slow or sudden retreat of the sea, such as Egypt, Chaldea, and the borders of the Gulf of Arabia. As to the universal deluges which happened after the first drying of the globe, it is remarkable that they are generally represented as sudden, and of short duration. We cannot see how such revolutions could have taken place, without adopting the idea that the globe of the earth is internally hollow, and that the dry land sunk into it. Accordingly, the formation of the mountains, by the sinking in of the land, necessarily forms a part of all the geogonic systems which proceed upon the humid plan.

The volcanic system equally appears to have originated with some Oriental nations; for those Greeks, who embraced it, derived their information from the east. To this system belongs the hypothesis of the *raising up of the mountains*, to which some Hebrew prophets, posterior to Moses, appear to allude.

Belus, the Assyrian law-giver, appears to have admitted that the earth exists periodically in a state of universal combustion, and in that of general inundation.[d] According to a passage of Trogus Pompeius,[e] the two systems which attribute the origin of the world to fire and to water, divided the opinions of the philosophers of the east. Those who adopted the former, thought that the earth had slowly and successively cooled, from the poles to the equator; their antagonists maintained, that the sea had gradually retired.

The ideas of the Orientals furnished the Greeks with

[a] Delamétherie, Théorie de la Terre, tome v. p. 280-533.

[b] Plato, in Timæo, id. in Cratea. Manethon, Epit. Natur. Hecat. de Philos. Egypt. lib. 1.

[c] Compare Deluc, Lettres à Blumenbach, 1798. Id. A Treatise on Geology, 1809. Geogony, in 2 vols. (in German) by Silberschlag, Berlin, 1780. contains a very good explanation of the Mosaic system, regarded in a historical point of view. The celebrated Orientalist, Eichhorn, at Gottingen, has explained it poetically. See his Repertory of Biblical and Oriental Literature, vol. iv.

[d] Berosus, ap. Seneca. Quæst. Nat. iii. c. 29.

[e] Justin, Hist. Epit. lib. ii. cap. i. Cicero, De Nat. Deor., i. Quæst. Acad. iv. Sen. Quæst. nat. iii. 13.

the foundation on which they have reared all their fanciful geogonic superstructures. Thales imported from Egypt the Neptunian system, which was probably that of all the ancient Greek poets and mythologists. Homer seems to adopt it.[a]

From Aristotle and Plutarch we learn, that these ancient Neptunists founded their system on one single principle, humidity; because, from humidity, animals, plants, and even fire, appear to derive their origin.[b] Were not these ancient philosophers as far advanced in knowledge as our own modern geologists, who say, that a watery solution has alone been able to hold, in a dissolved state, all the solid, liquid, and fluid bodies, whose union composes the globe and its atmosphere?

The descriptions which Lucretius, Virgil, and Ovid, give us, of the first formation of the terrestrial globe, contain all the principal ideas of the modern Neptunian theories; solution in a vast fluid, or in chaos, chemical precipitation by attraction or affinity, mechanical precipitation and deposition, and, at last, coagulation and consolidation.

The number of Grecian philosophers who attribute the origin of the earth exclusively to elementary fire, does not seem to have been considerable; for we cannot affirm that such was the opinion of Pythagoras, although he looked upon the soul of all beings as a particle of divine fire. The obscure Heraclitus was the first who said, that "fire had formed all things, and could destroy all."[c] The stoics, according to Cicero, should have been of this opinion, but Seneca declares, on the contrary, that they regarded water as the principle of the world. Besides, when Heraclitus said, "that the earth was the thickest sediment of fire, that water was earth dissolved by fire, and that water in the state of vapour formed air,"[d] it is evident that he did not think of the system of the Vulcanists; he intended only to found a general system of corpuscular philosophy.

The same remark holds with respect to those who ascribed the creation of the earth and the universe to the concourse of particles or atoms scattered in the immensity of space. In the atoms of Democritus and Epicurus, which adhered to one another by means of some small inequalities of shape, which served as a kind of crotchets or hooks, in the *corpuscles which prefer* and attract each other, in virtue of their similar nature,[e] we recognise the fundamental principles of our theory of chemical affinities, and, consequently, of our most modern and most celebrated systems of geology. The union of atoms is evidently the same thing as the *simple attraction* of particles; and whether we say these corpuscles choose to *unite, because they are* of a similar nature, or these particles tend to unite by an *elective attraction*, all the difference consists only in the greater or less precision of the expressions.

The idea of Franklin, who makes every thing to originate from air, had been broached by Anaximenes of Miletus, whose opinions are without doubt misrepresented by the contracted minds of those who accuse him of atheism.[f]

The Greeks did not rest satisfied with these general systems; they formed hypotheses of a more definite character, founded upon facts supplied by the physical geography of the countries then known. The flowing out of the lakes or marshy pools which covered Thessaly before the formation, or rather before the enlargement, of the valley of Tempe,[g] suggested the idea, that all the inland seas, and especially the Pontus-Euxinus, or Black Sea, had been originally enclosed lakes, to which some violent revolution had opened an outlet. Xanthus and Strato having observed that the soil of Upper Asia contained sea shells, justly concluded that these countries had been covered with sea water;[h] but when Strato attempts to explain this phenomenon, which is common to all the globe, by supposing a local cause, by the existence of an ancient inland sea, formed by the union of the Pontus Euxinus with the Caspian, he falls into one of those paralogisms which appear to be almost hereditary in the pretended science of geology. We shall prove, in the proper place, that such an inland sea has not existed since the commencement of historical times. The general revolutions which may have been caused by the breaking up of the great lakes and inland seas, must have taken place long before the existence of the human race; and the deluges that have been occasioned by a derangement of the sea, belong to an age far beyond the reach of history. This is completely proved by the consideration of animal remains.[i] But the soil of Greece, from its very nature, must have frequently given way and sunk down, and consequently the country must have frequently experienced local inundations. The deluge of Deucalion desolated Thessaly, especially the mountainous canton named Hellas;[k] that of Ogyges overwhelmed Bœotia.[l] Popular tradition naturally referred to those disasters which had ravaged whole provinces, every ancient inundation, the remembrance of which was preserved in any district. Thus a single opening, of inconsiderable extent, was shown in Attica as the *funnel* by which all the waters of Deucalion's flood were drained away.[m] Twelve or fifteen centuries after the epoch assigned to these events, historians began to collect these scattered traditions, and to compose from them highly finished descriptions of pretended universal deluges, unknown to more ancient authors.[n] Other Greek writers, dissatisfied with these sudden revolutions, these irruptions and deluges, invented the hypothesis of the gradual drying up of the sea. Aristotle charged them with drawing a false conclusion from authentic facts. "It is true," said that great naturalist, "that several countries, formerly covered with water, are now united to the mainland, but the contrary also happens; the sea has made several irruptions."[o] The hypothesi of alluvial additions to the land was also proposed

[a] Iliad, xiv. 246.
[b] Aristotle, Metaphys. lib. i. cap. 3. Comp. id. Météorol. i. 14. Plut. de Placitis Philosophorum, b. i. c. 3.
[c] Dio. Laert. lib. ix. S. Justin, Parœnet. ad Græcos. Stob. Physic. Eclog. i. c. 13.
[d] Plut. de Placit. Philosoph. i.
[e] Paresque cum paribus jungi res, &c. Lucret.
[f] Plut. de Placit. Stob. l. c. August. de Civ. Dei, viii. 2. Cic. de Nat. Deor. i.
[g] Herod. vii. 129, 130. Strab. ix. 667. Almel. Lucan, vi. 364, &c.
[h] Strab. Geog. i. 35. Alm.
[i] See above, Book XII. near the end.
[k] Apollod. i. c. 7. Arist. Meteorol. i. 14.
[l] Varro, de R. R. iii. Comp. Frèret, Mémoire sur les Déluges d'Ogyges et de Deucalion, Académie des Inscriptions, t. xxiii. p. 129.
[m] Pausan. i. cap. 18.
[n] Diod. v. 49. Lucian, de Dea Syria. Plut. de Solert. anim.
[o] Arist. loc. cit.

Polybius imagined that the Pontus Euxinus, or Black Sea, would be filled up by the mud which the rivers conveyed into it;[a] but two thousand years have been insufficient to fulfil this geological prediction. The waters of the river Pyramus, in Cilicia, have made no addition to the opposite shores of Cyprus, as the oracle had foretold. Lastly, some of the Greek philosophers attributed to volcanic eruptions effects much more considerable than those for which we have any historical evidence. Strabo imagined that they could raise and swallow up whole countries; and he mentions, as a proof, two towns in the Peloponnesus that were overwhelmed by an earthquake.[b] Thus do we discover, among the ancient Greeks, the germ of all the theories of modern geology, and the same disposition to confound facts belonging to different epochs, to exaggerate phenomena, and to deduce general conclusions from local facts.

Among the moderns, *Palissy* was the first to unfold correct ideas respecting fossil shells; he protested against the misconceptions of those who were for considering them only as the sportive productions of nature; he even ventured to maintain, that these fossil remains of marine animals were too abundant to have been carried into the places where they are found, by a sudden catastrophe resembling the deluge described by Moses.[c] *Stenon* demonstrated anew these truths, which were of too bold a character for the age of Palissy. Proceeding still farther, he acknowledged that the strata of the earth must have been formed as deposites in a fluid, and that mountains owe their origin to the subsiding and rupture of strata originally horizontal.[d]

Burnet, a man of great talents, but who had not carefully observed phenomena, constructed the first complete theory. Before the deluge, says he,[e] the surface of the earth was a level plain, with neither mountains nor valleys. All substances were disposed around the centre of the globe, according to their specific gravity, water every where occupying the surface. The oily substances, however, being lighter than water, formed by degrees an upper layer, which enveloped the waters and the whole of the globe. Upon this extremely fertile crust, the antediluvian generations lived in perpetual spring. The deluge made every thing change its appearance; the crust became dry, and the accumulated waters struggled against this light covering; it burst and sunk into the abyss of waters. This changed the axis of the globe, and consequently the temperature of its climates. The raised edges of the broken crust formed our present mountains. It is unnecessary to show, that this system, founded solely on the observation of floating islands, is altogether insufficient to explain the origin of those hard and heavy rocks of which our mountains are composed.

Descartes[f] and Leibnitz[g] take a still bolder flight, imagining that the earth is a small sun, covered with an opaque crust, which, by sinking down, gave birth to the mountains. Leibnitz considered the whole mass of the globe as having been vitrified; an idea quite untenable, although Buffon has been carried away with it.

Another arbitrary system was proposed by Whiston.[h] This astronomer considers the earth as a comet, which has forsaken its original track, from a cause which he does not specify, to revolve in the orbit of a planet. Being no longer subject to the extremes of heat and of cold, the chaotic matter of this ex-comet was precipitated according to the laws of specific gravity. A part of the primitive heat of the comet was preserved in its centre; this centre was surrounded by water, the exterior crust of the globe was of uncommon fertility, and the inhabitants lived for centuries. But the excessive warmth had the effect of inflaming their blood; they became so impious, that the Creator was compelled to destroy them with a flood. For this purpose he caused another comet to approach, which enveloped the earth in its immense tail; and as the tail of a comet is composed of vapours and water, (who dares to doubt it?) the temperature of the earth was considerably diminished. Besides, the attraction of the comet disturbed the equilibrium of the waters in the interior, and thus occasioned a violent flux and reflux in their mass. The exterior crust of the earth being violently shaken, sunk down in one place, and cracked in another. In this way, an universal deluge took place. The comet, after executing the will of the Creator, receded; the waters, recovering their equilibrium, entered again into the subterraneous cavities, which had been sufficiently enlarged to receive the waters of the comet. The coldness, and other bad qualities of these waters, have reduced the earth to that degree of barrenness and exhaustion which we now so much deplore. This hypothesis of Whiston has often been revived in whole or in part. Dolomieu has borrowed from it his principal ideas.

Woodward, a countryman of Whiston's, and an indefatigable and scrupulous observer, invented a much more modest theory.[i] He admits, that all terrestrial substances have been in a state of aqueous fluidity, and supposes that the whole interior of the globe contains an abyss of water which must have been sufficient for the purpose. The deluge of Moses consisted in a falling down of the crust of the globe into this great abyss, the waters of which, according to Woodward, possessed a peculiar dissolving power, which did not act upon shells and other remains of the animal kingdom. It is evident that the acuteness of Woodward led him to perceive the impossibility of explaining the position of so many beds of shells in the midst of stony masses by the occurrence of a single short-lived inundation. But his *dissolving power* is, according to his own admission, an occult and miraculous property. An intelligent German, Camerarius, in attacking Woodward, conjectures, what has since been demonstrated, that the beds of shells neither have nor could have been transported by any deluge; and that, on the contrary, the animals to which the shells belong have lived and died in the same place.[k]

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[a] Polyb. Hist. l. iv. cap. 40-42. Edit. Gronov. i. p. 428-433.
[b] Strab. i. 54, edit. 1620.
[c] Encyclopédie Méthod. Géographie Physique, i. art. Palissy.
[d] Stenon, Dissert. de Solido, intra solidum.
[e] Theoria telluris sacra, &c. London, 1681.
[f] Principes de Philosophie, Part iv. No. 2.
[g] Protogæa, in act. erud. 1683.
[h] A New Theory of the Earth. Lond. 1708.
[i] Woodward's Essay on the Natural History of the Earth, 1723.
[k] Camerarius, in Dissert. Taurinens, p. 226, Tubing, 1712

In replying to Camerarius, who states his opinion in a manner far from distinct, Woodward asserts the fact that volcanic eruptions have given origin to no considerable mountain, far less to islands and entire countries.[a]

We shall say nothing of the vegetation of stones, the dream of the celebrated Tournefort, nor of some detached propositions of Scheuchzer, whose genius was fettered by the prejudices which attributed all the changes of the globe to a single deluge. The ingenious Fontenelle was the first who had the merit to assert that more revolutions than one must have contributed to model the surface of the globe, and to heap up those vast ruins which surround us on all sides.

The volcanic system found at this same period several warm and able defenders, whom it would be wrong to pass over in silence. Ray imagined, that at the very moment of the creation, at the time of the separation of the humid and solid substances, there were earthquakes which heaved up the mountains. The earth gradually emerged from the waters of the sea, which gave to marine animals time to deposite their exuviæ in the bosom of the ocean.[b]

Hook, while he supposed that strata were originally formed like sediment in a fluid, admitted the occurrence of volcanic eruptions sufficiently powerful to raise up extensive tracts of ground, and even to melt and calcine them.[c] Lazaro Moro, observing that there are some mountains which contain neither the remains of sea animals, nor any marks of stratification,[d] attributed a volcanic origin to all the secondary mountains; these are, in his opinion, flowings of lava which have had their origin under the waters. By modifying and combining these different ideas, Raspe composed his volcanic theory of the formation of new islands, a theory which many distinguished vulcanists have inaccurately copied.[e]

These different systems were completely eclipsed by that which was created by Buffon, and which his splendid genius adorned with all the charms of poetry. According to him, the suns and comets were formed as we see them, and projected with an impetus sufficient to carry them forward in their orbits. But about 96,000 years ago a comet fell obliquely into the sun, and detached from it the 650th part. This entire mass, hurled into the immensity of space, separated into fragments, which formed the several planets of our solar system, and which, from their rotatory motion, accquired a spheroidal shape. Our globe was in a state of incandescence, but its surface by degrees cooled and consolidated, retaining however many immense cavities. Part of the vapours, which were elevated in the atmosphere, condensed and formed the seas. These waters, acting upon the solid part of the globe, decomposed a portion of it, and in this way formed the earths and stones. The waters of the ocean, attracted towards the equator by the tides, carried with them a vast quantity of dissolved substances, "and thus," says Buffon, "gave rise to those great chains of mountains which extend from east to west. Unfortunately these chains do not exist; the great range of mountains which surrounds the globe has another direction;[f] so that Buffon is to blame for explaining, by a supposition improbable in itself, a fact which is quite imaginary. But let us proceed with the statement of his theory. The primitive waters of the globe withdrew into the cavities of which we have already spoken, then the continents appeared. The earth, in the space of 43,000 years, grew so much cooled that its surface could admit of the existence of vegetables and animals, which started first into being about the pole, and gradually spread themselves towards the equatorial regions. The secondary strata were formed from the decomposition of vitrified substances, mixed with marine sediment; accessory causes, such as winds, currents of water, volcanic eruptions, and earthquakes, afterwards modelled the mountains and the valleys. The ocean slowly changes its shores by its general motion acting against the eastern coast, which it gradually destroys, and in this manner may have several times completed the tour of the globe.[g]

The system of Buffon, refuted in its principal points by the observations of naturalists, is no longer supported even by those who consider fire to have been the chief agent in the formation of the globe. All hypotheses which pretend to explain the first origin of our globe, and the manner in which it was projected into space, are now regarded as chimerical. Geology attempts only to ascend by the examination of physical monuments from one epoch to another, until it arrives at a state of things anterior to all these monuments.[h] At the same time, the rapid accumulation of facts has led the most enlightened men of all parties not to exclude any particular cause,[i]—a principle which has, in part, produced a blending of different systems, and a mutual tolerance for more exclusive opinions.

The theory which is now most keenly supported, is that of Deluc. This philosopher supposes that the earth, and all the celestial bodies, were masses of confused elements, in which the divine will, by communicating to them a certain quantity of light, produced chemical precipitations, whence was formed that crust of solid rocks whose fragments we see around us. This consolidated crust sunk down several times; such of its edges, as were supported on the partitions of subterraneous caverns, formed the mountains. The waters which at first covered the whole globe, filtered down into the central parts, where the ancient chaos always subsisted; then appeared the first continents, of greater extent than ours, but suspended above immense caverns; and, before they were enlightened by the sun, producing vegetables of a nature different from ours; the remains of which form our coal mines. The present continents, concealed under the sea, were covered with deposites of shells; volcanic eruptions spread there their beds of lava. By a general and final subsiding, the primitive

[a] Natural History of the Earth, Enlarged and Defended, &c. p. 115. *sqq.* Lond. 1726.
[b] Ray, Three physico-theological Discourses, p. 164, Lond. 1693. 2d edit.
[c] Hookii, Oper. Posthum. 299-310. Edit. Lond. 1705, in folio.
[d] Laz. Moro, de l'Orig. des coquillages fossiles, ch. 12, 13. 1740.
[e] Raspe, Specimen historiæ naturalis globi terraquei præcipue de novis e mari natis insulis. Leipzick, 1763.
[f] See Book vii.
[g] Buffon, Theory of the Earth, in the 1st vol. of his Natural History Paris, 1745
[h] Deluc, Elémens de Géologie, § 10, p. 11.
[i] Delamétherie, Théorie de la Terre, § 1700.

continents sunk into the recesses of the subterranean cavities. The sea was precipitated upon the land, and ingulphed the whole race of its inhabitants. This catastrophe was the *universal deluge*, described by Moses, traces of which are to be found among the traditions of almost all nations. It was then that our present continents, formed beneath the ocean, suddenly arose into view. In the light soils of these continents were found, buried in promiscuous heaps, the remains of quadrupeds once the inhabitants of islands which had sunk down before the universal deluge, and the skeletons of cetaceous animals which had peopled the sea. The preservation of these remains, which are still met with almost entire in cold countries, and the inconsiderable thickness of the beds of vegetable mould formed above our continents, unite to prove that their antiquity, or rather their appearance above the waters, is not to be dated many ages beyond our own.[a]

Such is the theory of the celebrated naturalist of Geneva. The principal feature of this system, viz. the repeated subsidings supposed to have taken place in the surface of the globe, and some of its subordinate details, particularly those regarding the origin of animal remains, have obtained for it a very favourable reception among philosophers. There is some difficulty in conceiving the existence of the vast cavities in which the antediluvian world was ingulphed; it would seem that this idea, borrowed from Woodward, has been introduced into the theory, solely from a desire of accounting for the deluge.

Some naturalists, who admit, with Deluc, that the earth was formed in a state of aqueous fluidity, differ concerning the rank they assign to the agents which have produced the revolutions and ruptures of the crust of the globe. Saussure sometimes expresses himself, as if he admitted heavings up of the earth by volcanic fire, "or by other elastic fluids," in order to explain how beds of granite, which serve as a base to all the others, have, in certain places, been so elevated as to form the summits of mountains.[b] But the idea which he has uniformly maintained, is, that of very violent currents, which, by agitating the ancient sea, drew along with them, to a great distance, the fragments of primitive rocks, particularly of granite, which are found scattered on the surface of ground of secondary, and even of tertiary formation.[c] It is difficult to conceive currents possessed of a force capable of rolling to a distance, entire portions of mountains, even though we should suppose the valleys filled up, and forming an inclined plane. It is more natural to attribute the phenomenon in question to marine ice, which may have carried these fragments of mountains across the ancient sea.

The celebrated Werner, while he attributes a great influence to subsidings, thinks, however, that various facts, and, among others, the position of basalt, are explained only by supposing a periodical increase and diminution of the mass of fluid elements.

When Pallas explains the occurrence of the remains of elephants in Siberia, by imagining a general overflow of the waters of the Indian Ocean, which, according to him, would have covered and traversed the upland plain of Central Asia, as they rolled from south-east to north-west, he has recourse to earthquakes and volcanic eruptions, to produce so extraordinary and inconceivable a movement.[d]

The ingenious Delametherie has composed a theory very circumstantial in its details, and supported by many facts, in which he endeavours to reduce the revolutions of the globe to chemical laws, without, however, excluding the agency of mechanical causes. This chemist represents both the mountains and the valleys as having been formed by crystallization in an immense fluid, which he gets rid of by means of evaporation, because he is determined to consider the central mass of the globe as a solid crystal.

The opinion of Deluc, as to the comparatively recent date of our continents, has been adopted by a distinguished naturalist, who, without constructing any general system, has thrown out some detached views, which, however, are very fruitful in results. Dolomieu, it would appear, scarcely aimed at any thing more than to disencumber Whiston's theory of some of its hypotheses. All the geological agents of this philosopher; the solution of all terrestrial substances in a solvent which has been destroyed; the coagulation of these substances, which after the destruction of the primitive solvent were precipitated and crystallized, so as to form a crust; *the exterior cause, whatever it might be*, which broke and pulverized this crust, and the tides of eighteen hundred toises in elevation, which set in motion the whole mass of waters, swept the bottom of the seas, raised and transported banks of shells, hollowed out the valleys, and modelled all the secondary ground;—all these agents, we say, exist already in the theory of Whiston. It is even difficult to imagine the possibility of all these violent and sudden revolutions, without the concurrence of some celestial body; but as every thing proves the stability of the planetary system, it is only to the comets that we can have recourse. But how is it to be proved, that these comets are bodies sufficiently dense to exercise such force of attraction upon the terrestrial globe? Tycho, Galileo, Kepler, Lahire, and Herschel, have regarded the comets as ethereal meteors. Thus theories of the earth invariably terminate in questions which admit of no solution; and all that we learn from studying them, is to distrust them.

"To distrust them!" some Scotsmen will exclaim, as they read these lines: "No; there is no more room for doubt, since Hutton and Playfair have discovered the true constitution of our globe. Do you not know that the present continents are wasting away by the action of the air, of gravitation and of flowing waters; that their materials, conveyed to the coasts, are thence scattered by the different movements of the ocean over the whole extent of its bottom; that a great *internal heat* hardens these materials, whence is formed a mass like that of the mineral beds of which our continents are composed; that when this slow disintegration has destroyed our continents, the *internal heat* raises entire the beds formed at the bottom of the sea, in conse-

[a] Deluc, Lettres sur l' Histoire de la Terre, addressées à M. Blumenbach. Id. Elémens de Géologie.

[b] Saussure, Voyage dans les Alpes, § 919.

[c] Id. Ibid. §§ 587, 1596, &c.

[d] Pallas, Observations upon the Origin of Mountains, p. 74. French Transl.

quence of which its waters are spread over the wasted and demolished continents, and new continents are produced, to be subjected in their turn to a similar disintegration? This great process of the alternate production and dissolution of continents, has already been frequently repeated, and no limit can possibly be fixed to its future duration."[a]

Our readers will of themselves perceive how very contrary this new system is to the evidence of facts. We shall only beg of them to observe, that the idea of the formation of mineral beds, by an effect of subterraneous heat similar to that which Sir James Hall has exemplified in his celebrated experiments,[b] deserves to be thoroughly investigated, independently of its connexion with the Huttonian system.

Whilst the philosophers of Europe were discussing the claims of these theories, the new world produced, or rather revived a system completely different from all of them. Franklin, like Anaximenes of old, supposed that not only all terrestrial substances, but even all matter, had existed as an elastic aeriform gas, irregularly diffused throughout the celestial spaces. Gravitation began to be felt; the gaseous particles were attracted towards various centres, and formed globes of air. This being supposed, it is easy to form a conception of the whole of Franklin's system. All substances are capable of being reduced to the aeriform state; therefore, concluded Franklin, they may all have been produced from the condensation of air, and thus must have been formed the exterior crust of the globe, which in this system is merely a thin solid covering around a vast elastic fluid. The movements of this *central* air occasion earthquakes. This system, in short, is not a mere satire upon the theories of the earth, as some have supposed; it is an hypothesis quite as rational and ingenious as those of the geologists.

After having traced geology to the ethereal regions, what have we farther to do? Shall we augment the number of systems, by endeavouring to shew that the earth was once surrounded by a ring like Saturn, and that the falling in of this celestial vault gave rise to that chain of mountains[c] which occupies the ridges of the great continents, and thus forms, as it were, a belt to the globe?

[a] Playfair's Illustrations of the Huttonian theory of the earth. Edinburgh, 1802.

[b] By these experiments of subjecting substances to intense heat under very great pressure, limestone was fused without losing its carbonic acid, and greenstone, after fusion, was little altered in its appearance, and not converted into a slag, as by fusion without pressure.—P.

[c] See Book vii. p. 66, of this work.

BOOK XX.

Continuation of the Theory of Geography. Of the Earth, considered as the residence of organic beings.

SECTION I.

OF THE GEOGRAPHICAL DISTRIBUTION OF VEGETABLES.

We have decomposed the terrestrial globe into its solid, liquid, and aeriform parts. Let us now proceed to the consideration of those innumerable beings which exhibit the spectacle of life upon every point of the globe; which embellish its surface, which feed upon its inexhaustible stores of nutricious juices, and which, by one common destiny, find in it a thousand different graves. These productions, and these inhabitants of the earth, are not scattered over it by the hand of blind chance; general laws have assigned to each class of these organic beings its cradle and its grave; and these laws it becomes us to study before we commence the description of the different parts of the world.

Vegetables, from the abundance in which they are produced, and from their intimate connexion with the soil, claim the first rank. It is for the botanist to examine in detail the treasures of the vegetable kingdom; the business of the physical geographer is only to mark its general distribution; and here he finds abundant reason to admire that wisdom which presides over the constitution of the globe.[a]

The temperature of the air appears to form the only physical limits to the extension of vegetable nature. The scale of atmospherical heat serves accordingly as the ordinary scale for the progress of vegetation. Hence, under the burning climate of the torrid zone, we have only to ascend the mountains to enjoy the fruits and flowers of the temperate regions. Tournefort found, at the base of Mount Ararat, the common vegetables of Armenia; half way up, those of Italy and France; and, upon the summit, those of Scandinavia. Forster saw several alpine plants upon the mountains of Terra del Fuego.[b] If the valleys of the Andes are adorned with bananas and palm trees, the more elevated regions of that chain support oaks, firs, barberries, and a number of kinds common to the north of Europe.[c] Man, availing himself of this circumstance, has transported and disseminated almost over the whole surface of the globe, those herbaceous plants[d] which supply him with his principal nourishment. Some useful plants have been rendered common to every climate by nature herself. Antiscorbutic vegetables, so salutary for the mariner, when languishing from the long use of salt provisions, are met with wherever there is a vestige of life. Cresses, succory, and wild sorrel, are found upon the ever-frozen shores of Hudson's Bay, and in Siberia, as well as in those blissful islands which are scattered in the midst of the Pacific ocean.[e] The shrubs which produce berries, and small fruits agreeable to the taste, thrive in the most uninhabited countries. Even in Greenland, the currant bushes bear very good fruit. Lapland possesses a considerable resource in its shrubs, such as the barberry, the dwarf mulberry tree,[f] the wild wood vine[g] (*vitis idæa*) and others.

Neither external cold, nor the absence of light, entirely extinguishes vegetable life. Caverns and mines give birth to a certain number of plants, particularly to those of the cryptogamous class.[h] Several of the saxifrages and ranunculuses, the dwarf willows, as well as all the lichens, like the cold. The snow, far from impeding the vital functions of these vegetables, secures them against the effects of frost, and furnishes them in abundance with the oxygen which it contains, and which, by increasing their vigour, accelerates the germination of the seeds.[i] Ramond has proved, that plants covered by the snow for several years, have yet continued to live beneath it.[k] The organization of alpine or polar plants, admits of a growth and development so rapid, that a few warm days are sufficient to fructify them.[l] Perhaps even perpetual snow may be the abode of a species of vegetation; at least Saussure has discovered in it a kind of reddish dust, very probably of a vegetable nature.[m] Patrin, and Sokolof, saw in Dauria, ground covered with vegetables, though entirely surrounded by perpetual snow.[n]

Extreme heat checks still less the productive energies of nature in the vegetable kingdom, provided that it be attended with humidity. We see plants grow not only upon the borders of hot springs, but even in the bosom of those waters which seem likely to destroy them. Examples of this kind are to be found from Iceland to the Cape of Good Hope, and from Kamtchatka to the

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[a] Humboldt, Essai sur la Géographie des Plantes. Stromayer, Specimen Geographiæ botanicæ. Gottingæ, 1804. Bergmann, Geograph. Phys. Sect. vi.

[b] Bemerkungen, p. 154, (in German.)

[c] Humboldt, Essai sur la Géog. des Plantes, p. 34.

[d] "*Graminées*," Cerealia, bread-corn; nearly all the vegetables, which furnish farinaceous seeds, belonging to the family of *Gramineæ* or Grasses.—P.

[e] Anderson, Cook's Third Voyage, passim.

[f] "Murier rampant," *Rubus chamæmorus*.—P.

[g] "Airellier," *Vaccinium*.—P.

[h] Scopoli, Diss. ad Scient. Natur. part i. p. 84—120. Humboldt, Floræ Friberg. subterr. &c

[i] Hassenfratz, Journal de l'Ecole Pyolechnique, 4e cahier, ant IV. p. 570—576.

[k] Ramond, Observat. p. 51.

[l] Martens, Voyage to Spitzbergen, p. 24. (in German.) Linnæi, Flor. Lapp. præf. pl. xx.

[m] Capt. Ross observed, near Cape York (Baffin's Bay,) a tract of snow coloured dark crimson to the depth of 10 or 12 feet. The colouring matter consisted of red globules, from $\frac{1}{1000}$ to $\frac{1}{2000}$ in. in diameter, and cellular. They furnished ammonia by distillation, and were connected with a cellular membrane decidedly vegetable. Probably they were the remains of *Fuci*.—P.

[n] Patrin, Voyage, p. 19.

island of Amboyna.[a] The sulphurous exhalations, and the foul air of volcanic caverns, seem to exert upon vegetation only a slow and limited influence, while to animals they prove instantly fatal.[b]

The most formidable obstacle to vegetation is the absence of humidity. Look to those sandy deserts under the equator, as well as towards the pole, condemned to perpetual sterility. Not a drop of rain can settle on such a loose soil, always moving with the winds: not a seed can strike root into it. It is unquestionably to causes very similar that we must ascribe the nakedness of several mountains, whose precipitous sides, or flat summits, afford no shelter to the vegetable colonies which the winds transport to them, whilst on other mountains under a colder temperature several plants are still supported. For example, the shivering mountain[c] in Derbyshire produces no herbs, because its sides are daily decomposed in schistous plates, which are constantly gliding down to the bottom.[d]

The pressure of the atmosphere exercises a striking influence upon the configuration and life of plants. In vegetables the functions essential to life are performed chiefly at the surface; hence their great dependence on the medium by which they are surrounded. Animals are affected rather by internal excitement, and acquire of themselves the temperature which suits them. Respiration by the epidermis is the most important vital function of plants; and this function, in so far as it is subservient to the evaporation and secretion of fluids, depends on the pressure of the atmosphere; on this account the Alpine plants are so aromatic, so downy, and so plentifully furnished with secretory vessels. On the contrary, these plants grow with difficulty in the plains, where their respiration by the epidermis is impeded by the increased pressure of the air.[e]

The chemical nature of the soil manifests its influence upon vegetables, rather by modifying their juices, their fruits, and the stateliness of their appearance, than by setting limits to their propagation. Common salt, however, dissolved and scattered over the soil in considerable quantities, almost entirely prevents the growth of vegetables.[f] The fusion which lava undergoes, is probably the only cause which, for some centuries, retards the progress of vegetation on its surface, whilst the volcanic cinders raise most abundant crops.[g] In general, the soil serves only as a support and shelter to plants; they derive their nourishment from the water and the oily fluids which are collected together in the earth, and imbibed by their roots. A very small quantity of earth, dissolved in these fluids, is absorbed by the plant. Other causes also contribute to the support of vegetable life. Plants respire through their air-vessels the different fluids of the atmosphere; the presence of light especially is indispensable to the chemical operation, by which the pabulum or food of the plant is assimilated to its substance. The elementary earths obtained from plants by chemical analysis, appear rather to be the product and remains of the digestion by which the vegetable assimilates its food, than particles immediately derived from the surrounding soil.[h] The experiments of M. Schrader have shown, that plants which vegetate in sublimed sulphur, give, when analysed, the same earth as those which grow in the ordinary way.[i] These observations, furnished by vegetable physiology, may explain why siliceous earth forms so large a portion of the substance of plants, although the calcareous soils are generally covered with a more vigorous and more abundant vegetation than the granitic soils. Calcareous earth attracts humidity, diffuses warmth, and supplies the plants with fixed air; but it is silex which predominates in the best vegetable earth.[k] Siliceous earth abounds in grasses, and in several varieties of rushes. There have been found in the ashes of rye-straw no less than 70 parts of silex in 100.[l] The joints of the bamboo contain crystallizations of pure silex.[m] There are, however, other plants which are as much impregnated with calcareous earth, such as the *Chara vulgaris*, the *Hypnum crista castrensis*, the *Neckera dendroides*, and several cryptogamic plants.[n] Other plants, such as the *Salsola kali*, the salicornia, the mesembryanthemum, float almost in a solution of alkali. All the substances which chemistry procures from vegetables are reducible into four elements, namely, oxygen, hydrogen, azote, and carbon. The alkali which is extracted from several vegetables, probably owes its origin to azote. Tannin, the principle of astringency, which is found in the bark, the roots, and the leaves of some trees, seems to be carbon in a particular state. Vegetable physiology is full of uncertainty, and can furnish the geography of plants only with a very limited number of principles.

The empire of vegetation embraces the globe from pole to pole, and from the summit of the Andes, where the lichen creeps over the hardest rocks, to the bosom of the ocean, from which rise floating fields of algæ and fuci. Cold and heat, light and shade, fertile lands and pathless deserts, every place and every temperature has its own kind of vegetation, which thrives and prospers there.[o] Plants of the cryptogamic class even ramify upon the dark vaults of mines, and upon the walls of the deepest caverns. The course which vegetation pursues in its conquests over inorganic matter, presents remarkable gradations. "Let a volcano," says M. Humboldt, "raise up from the bottom of the sea, all at once above the boiling waves, a rock covered with scoriæ; or, to refer to a less dreadful phenomenon, suppose the

[a] Olafsen and Povelsen, Travels in Iceland, (in German) ii. p. 31, and 181. Krascheninikow, Kamtchatka, (in German) p. 91. Sparman, Voyage, (in German) p. 142. Labillardiere, tom. i. p. 324.
[b] Soulavie, Works of Hamilton, p. 246. Smith's Tour, &c. ii. p. 103.
[c] Mam Tor.
[d] Kuttner, Beytræge, &c. i. e. Mém. sur l'Angleterre, cah. vii. p. 20.
[e] Humboldt, Tableaux de la Nature, ii. p. 115. n. 14.
[f] Forskal, Flor. Egypt. p. 45.
[g] Hamilton's Works, p. 33. Brydone's Tour, vol. i. p. 116
[h] Senebier, Encycl. Method. Veget. Physiol. vol. i.
[i] Schrader. deux Mémoires couronnés sur la nature des parties terreuses des plantes, Berlin, 1800. (in Germ.)
[k] Expériences de Fourcroy, de Giobert, &c. Encycl. Nat. Physiol. Veget. vol. i. p. 276.
[l] Schræder obtained from 32 oz. of rye-straw, 152 grains of silex, or nearly 5 grains to each oz., or one part silex to about 101 of straw. The ashes of wheat straw gave Saussure jun. 61.5 parts silex in 100; those of the chaff of barley, 57 parts in 100.—P.
[m] Lampadius, Samlung praktischer Abhandl., iii., p. 187. Davy, Nicholson's Journal, vol. ii. No. 27. p. 56. Macie and Russel, Philosoph. Transact. vol. lxxx. and lxxxi.
[n] Humboldt, Aphorism, p. 105, 106.
[o] Linneus, Amœnitat. acad. vol. iv. p. 64.

nereides, with united industry, continue to elevate their cellular abodes for thousands of years, till, finding themselves above the level of the sea, they die, after having in this way formed a flattened isle of coral; organic force is instantly ready to produce vegetation upon this rock: yet who can have brought there so suddenly the seeds of plants? Is it the birds, or the winds, or the waves of the sea? It is the great distance from the coasts which renders it difficult to decide this question. But scarcely has the air come in contact with the naked rock, when in the northern climates there is formed upon its surface a net-work of tufted threads, which appear to the unassisted eye like coloured spots. Some of them are bordered by salient lines, sometimes single, sometimes double; others are traversed by furrows which cross each other. As they grow older, their bright colour darkens; the yellow, which shone even to a great distance, changes into brown, and the bluish gray of the lepraria insensibly acquires a tint of dusty black. The extremities of the older coverings approach and mingle together; and upon this dark ground are formed new lichens of a circular form, and of a dazzling whiteness. It is thus that an organic net-work is wrought in successive layers. Where the majestic oak now raises its aerial head, slender lichens once covered the bare rock. Moss, grasses, herbaceous and shrubby plants, fill up this long interval, the duration of which cannot be calculated: in the torrid zone, the portulaca, the gomphrena, and other low plants inhabiting the shores, supply the place, and produce the effects of the lichens and mosses in the northern climates."

This interesting observation tends to establish certain epochs in the history of the successive propagation of the plants which now cover the earth: without doubt, when vegetation had already thrown her verdant mantle over the primary and secondary mountains, the tertiary lands might still be seen scarcely dried, covered with muddy slime, and sown with some languishing plants, rushes, mosses, and thick bushes of osier and willows. The Greeks alleged, that men, animals, and plants, inhabited the mountains long before they spread themselves over the plains, and along the coasts.[a] Tacitus describes Germany as full of inaccessible marshes, which are now in a great measure dried up. Rudbeck himself admits, that according to the traditions of the country, the low parts of Scandinavia presented the same aspect.[b] Thus, history appears to confirm the hypothesis so ingeniously developed by Lacepede and Ramond;[c] according to which, we ought to look upon the great chains of mountains as so many centres, whence vegetable, as well as animal population, was scattered over the rest of the globe.

In truth, the chains of the Alps, of Mount Atlas and Mount Taurus, the central upland plain of Asia, and that of Southern Africa, the Andes, and the Allegany mountains, seem to be the native land of the vegetables which cover the countries lying at their base. To these grand centres of the vegetable kingdom, the progress of discovery will, ere long, add the upland plains or chains of mountains which are supposed to occupy the interior of New Holland and the north-west parts of America.

It would, we conceive, be extremely unwarrantable to reduce these centres of vegetable and animal life to one single centre, as has been attempted by several philosophers, led away by an undue regard to mythological traditions, or to their own interpretation of the sacred records. Could the organic energy by which matter was animated, have acted originally only upon one point of the globe? Would not nature, upon the banks of the Senegal, have exercised the same power as upon the shores of the Ganges? Why should corn have sprung up in Tartary before it grew in Europe? Why should not Spain and Italy have produced wild olives, when Persia, which is much colder, is covered with them? The pretended migrations of plants are very much exaggerated. It is believed, for example, that Europe has received wheat and barley from Tartary, the walnut tree from Persia, the olive from Syria, the vine from the borders of the Caspian Sea; in short, we accumulate historical proofs, to show that all our useful plants come from Asia;[d] but all these observations of the ancients relate only to the *cultivation* of a plant, and not to its origin. Lucullus, without doubt, was the first who brought from Cerasus, in Pontus, the cherry trees since cultivated in Italy; but, in relating this fact, Pliny tells us that the cherries of Lusitania were the most esteemed in Belgic Gaul, and that Macedonia produced a particular kind.[e] Would he have spoken in this manner, had the cherry trees of Macedonia and Lusitania been propagated from those of Pontus? The same author, however, seems to allow that the vine was indigenous to Gaul.[f] Ancient traditions concur in ascribing the first cultivation of wheat to Sicily or to Attica, a cultivation contemporary with the first attempts at legislation.[g] A kind of rye, known under the Celtic name of Arinca, from which the term used in Dauphiny, "Riguet," is derived, was a native of Gaul.[h]

These examples, which it were easy to multiply, prove that the farinaceous plants, and in general the vegetables of Europe, may dispense with the honour of a foreign origin. On the other hand, we cannot deny that the migrations of man have a singular influence upon the geographical extension of plants. Not only has man intentionally carried the coffee-tree from Arabia to the West Indies, and the potato from America to the shores of Europe, but even the accidental introduction of a foreign grain into a bale of merchandize, has propagated many plants from the Brazils to the environs of Lisbon, and some of the plants of Portugal to the coasts in the neighbourhood of Falmouth and Plymouth in England.

There are in the dissemination of plants several singularities difficult to account for and even to define.

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[a] Plat. de Leg. iii. Oper. ii. p. 677. Edit. Serran. Aristot. Météorol. ii. 13. Strabo. Geog. l. xiii. 407. ed. Cas.

[b] Rudbeck, Atlantica, i. p. 45. Torfæi. Hist. Norweg. i. p. 111.

[c] Memoires de l'Institut et Annales du Museum.

[d] Heyne, Opusc. Acad. vol. i. p. 330-383. Linné, Coloniæ Plantarum, &c. Sprengel, quoted by Humboldt, Tableaux de la Nature, i. Dureau de la Malle, Aperçu de l'Origine des Plantes Céréales, Annales des Voyages, x. 321, *sqq.*

[e] Plin. lib. xv. cap. 25.

[f] Plin. xiv. 3, 9.

[g] Pausan. in Arcad. Callim. Hymn. in Cerer. Plin. vii. 56.

[h] Plin. xviii. 8.

Some plants appear to live in society, and occupy exclusively large tracts of ground, from which they banish all other vegetables. We can trace through Jutland, Holstein, Hanover, Westphalia, and Holland, a long chain of hills, entirely covered with common heath, and the Erica tetralix. The farmers have opposed for centuries, but with little success, the inroads of these vegetable hosts.[a]

It is singular that the genus called Erica, is found only upon one side of our planet. Of the 137 species of heaths at present known,[b c] there is not even one to be met with in the new continent, from Pennsylvania, and the coast of Labrador, to Nootka and Alaschka. They appear even very rare in Asia. We see, at other times, very singular leaps or intervals in the distribution of plants. Most of the forest trees of Europe, and even those which are the hardiest, disappear towards the Uralian mountains, and particularly towards the banks of the Tobol and the Irtysch; they do not grow in Siberia, although under the same climate. The oak, the hazel-nut tree, and the wild apple, are subject to this common law. In vain should we search for one plant of them from the Tobol to Dauria. The two first of these trees, however, re-appear suddenly upon the banks of the Argun and the Amur; the last occurs anew in the Aleutian Islands.[d]

These remarks will have shown how difficult it is to mark with exactness the *regions* of botanical geography, a subject which, besides, appears to belong to that part of our work which contains a particular description of the different countries. We must here confine ourselves to a brief sketch of the general appearance and the advantages of vegetation in the different *zones* of the globe.

The frozen zone contains few *species*, but, as in the short career of the Polar summer, vegetation is very rapid, these species comprehend a greater number of individuals than is commonly imagined. The verdure of the Polar summer is confined to the hills which have a southern exposure; though extremely short-lived, it is sometimes very brilliant. Besides mosses and lichens, we perceive ferns, creeping plants, and bushes with berries, such as the currant, the Rubus chamæmorus, the Rubus arcticus, and the different sorts of Vaccinium, the resources and the luxuries of Siberia and Lapland. No where else are these fruits more abundant, or possessed of a finer flavour. The frozen zone also admits of some trees, particularly the birch and willow; but they remain always dwarfs, never growing higher than one or two feet. Such, however, is the privilege of the climate of Europe, that Lapland, which is almost entirely situated in the frozen zone, produces rye and leguminous plants, and would, according to De Hermelin, have supported fine forests, if an unwise economy had not procured their destruction. As the mosses and lichens of Iceland and Greenland are found upon the Alps and Pyrenees, it may be said that the frozen zone possesses no species peculiar to itself.

The northern temperate zone may, with relation to the vegetable kingdom, be divided into two parts; but the limit of these demi-zones varies according to local climate from the 50th to the 40th parallel of latitude.

Upon the boundary of the temperate and frozen zone begins the perpetual verdure of the pine and the fir, trees alike distinguished for the almost crystallized regularity of their form, and for retaining their vital warmth amidst the chilling rigours of winter; resembling in this latter circumstance the natives of the soil, whose moral resources have surmounted all the disadvantages of their ungenial climate. Several fruit trees, the apple, the pear, the cherry, and the plum, and certain vegetables, such as cabbage, pease, and radishes, grow better, or are more cultivated in the northern half of the temperate zone. Flax and hemp are indigenous to it. The verdure is more brilliant there, particularly in the regions adjacent to the sea. As we advance, the oak, the maple, the elm, and the lime, gain the superiority over the pine and the fir. The more delicate fruits, such as the olive, the lemon, the orange, and the fig, and among the wild trees, the cedar, the cypress, and the cork, more especially belong to the most southern part of the same zone. There is even a perceptible difference in the cultivation of vegetables beyond and within the 45th degree. Beans, lentils, and artichokes, appear indigenous to the south of this line; the onions there have less pungency. Truffles and many other delicate or aromatic vegetables, do not come to the same perfection to the north of this parallel.

The vine and the mulberry occupy the space between the 30th and 50th parallels; we may even say, that if the vine has followed civilization to the 50th degree and beyond it, it is only in France, in Germany, and in Hungary, a part of the globe too small to be considered otherwise than as an exception. The true country of the vine is to the southward of the 45th degree. The people who live to the north of this parallel extort from the soil, by the application of labour and of skill, what nature lavishes away with spontaneous profusion on the ignorance of the vine-dressers of Italy, and the indolence of those of Spain. Peaches, apricots, almonds, quinces, chestnuts, and nuts, are equally injured in their growth as they approach the neighbourhood either of the tropic or of the polar circle.

Oats and barley are the kinds of corn which best bear the cold; barley, in particular, seems to lengthen or shorten the period of its vegetable life according to the duration of summer. In Lapland, and at Olekminsk in Siberia, it ripens in seven or eight weeks; notwithstanding this astonishingly rapid growth, it is sometimes overtaken by the frost of the Siberian winter.[e]

Between the 60th and 40th degrees, the more fortunate husbandman fills his granaries with rye, wheat, millet, and buck-wheat; rich in these treasures, he envies not the more southern climates their rice, their

[a] Humboldt, Tableaux de la Nature, ii. 47.

[b] There are upwards of four hundred sorts or varieties. T.

[c] 328 species of Heaths are given in the Edinburgh Encyclopedia. 321 of these are natives of the Cape of Good Hope; the remainder of Europe, N. Africa and S. W. Asia.—P.

[d] Géorgi, Description de la Russie, iii^e tome, 4^e partie, p. 1015, et 5^e partie, p. 1301, 1305.

[e] Georgi, Description de la Russie, iii. 716.

maize, and other grain of a similar kind. Grain of this description, less favourable to the health and vigour of man, can however be raised in the latitude of 50°; but a wise system of rural economy prefers the culture of less uncertain crops.

The European born to the north of the Alps, is ready to form a false idea of the character of the zone lying between the 40th and the 25th degrees of latitude. Leaving our majestic forests of oaks, and our delightful orchards, where his feet have been accustomed to tread upon a verdant turf, he crosses the Alps, the Cevennes, the Pyrenees, and, struck with the naked and scorched appearance of Provence, of Italy, or of Spain, he instantly figures to himself beyond the Mediterranean vast seas of sand in Africa, and is tempted to imagine that all this zone is naturally destitute of trees. In this opinion he is wrong. It is true that in all the countries adjacent to the Mediterranean, and where secondary calcareous earth predominates, a part of the surface of the soil is composed only of barren rocks. The beautiful picturesque appearance of Italy is chiefly produced by the agreeable contrast which is presented by the naked rock, and the lively vegetation scattered here and there over the surface: but wherever this rock, from being less cracked and chinky, retains the water at the surface of the ground, as is the case upon the borders of the enchanted lake of Albano, Italy has its forests of oaks as branchy and as green as those which we admire in the north of Europe.[a] The great deserts, or seas of sands in Africa, present merely a local phenomenon, and one which is not peculiar to the zones, since similar deserts occur in Persia and Tartary, under a much higher latitude. If we admit the theory of M. Deluc, they formed the bottom of the ancient sea of the globe.

It must however be allowed that the warm temperate zone, or that from the 40th to the 25th parallel, presents in general less constant humidity, and a less beautiful vegetation than the cold temperate zone. The only exceptions occur in the United States and in China, regions where, in consequence of their peculiar geographical situation,[b] the climate of the cold temperate zone and that of the torrid zone run so much and so frequently into each other as to produce a most agreeable mixture of the northern with the equatoreal vegetation.

The torrid zone possesses vegetable wealth, which we should in vain expect to realize in the other regions of the globe. It is in that zone that the most juicy fruits, and the most pungent aromatics arrive at perfect maturity, and vegetation of every kind is distinguished for stateliness, variety, and splendour. There the glowing beams of the sun raise the plant into a shrub, and the shrub into a tree. The simple sap, which in other regions merely flows in the veins of vegetables, there ripens and exudes through the stem under the form of balsams, gums, and juices, which either form powerful remedies against the attacks of disease, or gratify the fastidious and stimulate the blunted taste of the voluptuous European. What a paradise! if we could but transport thither civilization and morality. It is there that the ground produces the sugar-cane, the coffee-tree, the palm, the bread-tree, the pisang, the immense baobab, the date, the cocoa, the vanilla, the cinnamon, the nutmeg, the pepper, the camphor-tree, &c. &c. There are also various sorts of dye-wood, and particular kinds of corn, such as the durra, the holcus, the cambu, and the kebru, which almost exclusively belong to the torrid zone; while this zone is not destitute of any species which grows under a less ardent sun. The plant which in Siberia vegetates in the plain is found at the highest summits of the mountains under the line, and the sides of these same mountains correspond to the climate of the temperate zone.

The appearance of vegetation under the equator enchants the imagination; it is there that plants display the most majestic forms. As in the frosty regions of the north the bark of the trees is covered with lichens and moss, so between the tropics, the cymbidium, and the fragrant vanilla adorn the trunk of the anacardium, and of the gigantic fig-tree. The fresh verdure of the leaves of the pothos forms a contrast to the flowers of the orchises, variegated by a thousand different colours. The bauhinia, the climbing passion-flowers, and the banisteria, with its flowers of gold, twine around the trunks of the forest trees. Delicate flowers spring from the roots of the theobroma, as well as from the thick, hard and blackened bark of the gourd[c] and of the gustavia. In the midst of this exuberant vegetation, and this confusion of climbing plants, it often costs the naturalist trouble to ascertain to what stem the leaves and flowers belong. One single tree, adorned with the paullinia, the bignonia, and the dendrobium, forms a group of plants which, separated from one another, would cover a considerable space.[d] In the torrid zone, the plants which are most abundant in juices, present a brighter verdure, and larger and more magnificent leaves than in the northern climates. The vegetables which live in groups, and which render the countries of Europe of so monotonous an aspect, are very seldom to be met with in the equatoreal regions. Trees twice as high as our oaks are decked with flowers as large and as beautiful as our lilies. Upon the shady banks of the Madalena, in South America, grows a climbing aristolochia, the flowers of which are four feet in circumference. Children amuse themselves by covering their heads with them, We may add to this description, the gigantic forms of the baobabs, whose circumference sometimes extends to 80 feet, and the elegantly bold shape of the eucalyptus, and of the wax-palm trees,[e] which, rising to the height of from 150 to 180 feet, form aerial porticoes above the forests.

The extraordinary elevation to which whole tracts of country rise, under the tropics, and the cold temperature of that elevation, present to the inhabitants of the torrid zone an extremely singular prospect. Besides the groups of palm and banana trees, they see also around them the vegetable forms, which appear to belong only to the regions of the north. Cypresses,

[a] Humboldt, Tableaux de la Nature, i. 20.
[b] Compare Book xvii. p. 145.
[c] "Calebassier," Calabash tree, *Crescentia cujete*, Linne.—P.
[d] Humboldt, Tableaux de la Nature, ii. 60.
[e] "Palmiers à cire"

firs, and oaks, barberries and alder trees, nearly resembling ours, cover the mountainous districts of the south of Mexico as well as the chain of the Andes under the equator

The southern temperate zone should now terminate the phytographical description of the globe, could we venture to assert, that, with reference to vegetation, such a zone does exist. It appears that the three extremities of America, of Africa, and of New Holland, included in this zone, contain only vegetable colonies, which, taking their origin from the torrid zone of each of these regions, have spread themselves towards the south. It is therefore probable that the vegetation of these three continental extremities, even were it better known than it is at present, would present to us a few detached local scenes rather than any general picture.

BOOK XXI.

Continuation of the Theory of Geography. Of the Earth, considered as the residence of Organic Beings.

SECTION II.

OF THE GEOGRAPHICAL DISTRIBUTION OF ANIMALS.

The unknown power which first put in motion the springs of animal life, and which continues to keep them in play, was certainly not confined to one particular region of the globe. Matter, every where, must have acquired animation at tne sound of the Creator's voice; the elementary particles, while attracting each other, and ranging themselves in fibres, muscles, and bones, must have every where presented the spectacle of that *spontaneous generation*, which is probably, at all times, ushering into existence millions of aquatic and other animalcules, some of them so minute as appear to the most powerful microscope merely as a small point or globe, destitute of organs.[a] It is difficult to conceive that there exist in this original tendency of matter towards organization, differences founded upon the geographical situation of places.

Zoophytes are so imperfectly known, and so difficult to class, that we cannot say whether each maritime region possesses any species peculiar to itself. Coral, externally an animal and internally a rock, madrepores, and millepores, which, on the contrary, have a stony covering, seem to exist only in the regions adjoining to the tropics, in the seas warmed by the rays of a vertical sun. There are three or four great seas of coral upon the globe: first, that part of the great ocean which surrounds the Low islands, the Friendly islands, New Caledonia, and the Solomon islands, and in general those tracts of sea lying between the different parts of the Oceanic division of the world. It is there that the mariner is in continual danger of striking against some rock of coral, shooting perpendicularly up from an immense depth. The second region extends from the coast of Malabar to those of Madagascar and Zanguebar. Our Mediterranean forms the third region; but the valuable coral which it furnishes, and which is in great request from Africa to Japan, essentially differs from the coarse substances of which the islands in the South Sea are composed. The Gulfs of Arabia and of Persia, if we credit the ancients, are peopled with subterraneous forests of Zoophytes.[b] The sea of the Antilles, and the Gulf of Mexico, ought to contain a great many madrepores. But who is sufficiently acquainted with the different *holothuriæ*, *asteriæ*, *medusæ*, and other fugitive embryos of aquatic beings, to assign to them their native region? The indefatigable voyagers, Peron and Lesueur, who so carefully observed the changeable and delicate forms of the zoophytes,[c] found the abode of the genus *pyrosoma* confined to one particular region of the Atlantic Ocean; and they imagine that each description of zoophyte has its place of residence determined by the temperature necessary to support its existence.

The ocean also contains monsters, which it is dangerous to observe too near. When shall we come to distinguish the different kinds of polypi or hydras, with exactness sufficient to determine the boundaries of the tracts which they respectively occupy at the bottom of the ocean? We think it probable that the size of the polypi varies with the depth of the seas where they live. If we certainly know that the Straits of Messina, and the English Channel, contain some which have arms ten feet long, why should we treat as fabulous those very circumstantial accounts, both of the ancients[d] and the moderns,[e] which speak of polypi taken in the Mediterranean, in the Atlantic, and in the Indian seas, whose arms, when accurately measured, were found to be from 30 to 40 feet in length! Would it not be consistent with the rules of sound criticism, to suspend our judgment respecting the monstrous *krakens*[f] of Norway, said to be half a league in length, the existence of which several respectable naturalists[g] have conceived to be established by recent observations?

Zoophytes exhibit the first actings of creative power; they may be considered as confused masses of beings, animated with an incipient principle of life, but not yet existing separately.[h] The *mollusca*, whether naked or testaceous, have acquired a real individual existence. Accordingly, their different species belong to different countries: the shells of Timor are met with upon the coasts of New Holland only as far as to the south-west point; and the shells of Van Dieman's land, such as the *Haliotis gigantea* and the *Phasianellus*, diminish in size as they follow the coasts of New Holland, to king George's Straits, and entirely disappear beyond them.[i] The pinna marina, whose glossy filaments outshine silk, thrives only in the Indian seas, and in the Mediterranean. The pearl oyster attains perfection no where except in the equatorial seas. But the natural arrangement is often subverted; the ships to which shells adhere, transport them from the one pole to the other.

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[a] Compare Cuvier, Tableau Elémentaire des Animaux, p. 663.
[b] Plin. Hist. Nat. xiii. 25.
[c] Voyages aux Terres Australes, i. 492. et l'Atlas, pl. xxix.—xxxi.
[d] Plin. ix. 30. Ælian Hist. Nat. xiii. 6.
[e] Aldrovand, de Molluscis, Part vii. c. 2. Johnston, de Exanguib. Aquat. lib. i. tit. 2. c. 1. Swediaur, Journal de Physique, 1784, vol. ii. p. 284. *sqq.*
[f] See the article Norway, in this work
[g] Bosc. Hist. Nat. des Vers, i. p. 36. Montfort, Histoire des Mollusques, ii. 71, 153, 218. Pennant, British Zoology, iv. tab. 28. fig. 44.
[h] The Zoophytes have their organs in rays diverging from a centre, hence they are called radiated animals. They have, most of them, no nervous nor vascular system; some have no mouth nor intestinal canal, and some propagate by buds or division. Very many of them are compound; but the union of many individuals in one common mass, is also found in the *Mollusca*.—P.
[i] Péron et Lesueur, Annales du Muséum d'Histoire Naturelle, xv.

It is in this way that the waters of Holland have been peopled by the teredo navalis, so destructive to vessels.[a]

The calcareous secretion of the Zoophytes is rock or stone the very moment that the animal dies. The calcareous secretion of testaceous mollusca or shells, forms rock only when decomposing. The structure of corals and madrepores is grained, that of shells is lamellated or stratified. These animals, from their being destitute of sensibility, seem closely allied to the mineral kingdom.

We now advance to another order, which may be viewed as belonging to the vegetable kingdom,—the order of insects, in which worms occupy the bottom of the scale.[b] Insects which, as they pass through the states of larva and chrysalis, remind us of the successive development of bulbs, stalks, and flowers; insects, which may be termed winged and animated flowers, indicate already, in their complicated organization, some obscure traces of sensibility, although irritability still predominates. It is in the midst of the most exuberant vegetation—it is in the torrid zone—that the strongest and the most splendid insects are to be seen; such as the butterflies of Africa, of the East Indies, and of America, whose brilliant colours rival the lustre of metals. There also, and particularly in South America, the forests, peopled by millions of glow-worms, present to the eye of the benighted traveller the scene of an immense conflagration. The Termes of Africa, named also the White Ant, builds solid hillocks; and the spider of Guyana attacks even birds with success. The *limulus gigas*, the largest of all aquatic insects,[c] is also an inhabitant of the equator, as its vulgar name, *the Crab of the Moluccas*, indicates. Certain kinds, such as gnats, bees, and flies, appear to be equally distributed over the whole of the globe. The short polar summer hatches a multitude as innumerable as the heats of the torrid zone: the mosquito, which torments the traveller on the banks of the Oronoko, resembles that which buzzes in Lapland. Wherever man has not drained the marshes, and cleared the forests, insects reign with resistless sway. History has recorded several examples of towns and countries rendered uninhabitable by the multitude of bees, wasps, or gnats.[d] Armies and whole tribes have been compelled to fly before these feeble insects, rendered invincible from their numbers.

The secretions of insects do not resemble substances of the mineral kingdom; like those of the zoophytes and mollusca; they have the character of vegetable juices. But these secretions, as well as those of the polypus coral, appear to be the effect of blind instinct, rather than of sensations similar to those of the more perfect animals. The admirable industry of the bee is not to be ascribed to the acting of a free and separate will.

The orders of zoophytes, mollusca, and insects, advancing gradually in perfection, comprehend animals *with white blood, and no vertebræ*, and which, having few or no organs of sensibility, appear to constitute in the animal kingdom a sort of hemisphere diametrically opposite to that of animals *with vertebræ and red blood.*

This second series of the animal kingdom commences, like the first, in the bosom of the ocean, that cradle of all primitive organizations.

Fishes, although occupying the lowest degree of the scale, are completely distinguished from inorganic nature: they display the commencement of an internal ossification, mixed indeed with some traces of those external secretions, those solid coverings, which belong to animals destitute of vertebræ. Fishes, having neither the blind instinct of insects, nor a high degree of the voluntary instinct of the mammiferous tribes, appear inferior even to several white blooded animals, although they form part of an order superior to that to which these animals belong. The animal kingdom does not present to our view one unbroken progressive series, but two great series, each composed of several progressive orders; so that the gradations in improvement of organization are not continued from genus to genus regularly through the scale, but only from the whole of one order to the whole of another.

The want of industry which we have just remarked in fishes, renders it probable that every basin of the ocean has its particular tribes, which are born and die there: we know the stations of some species of fishes. Thus the cod which are distributed over all the northern seas, between Europe and America, congregate chiefly upon the great banks of sand to the south-east of Newfoundland. Pursued by twenty thousand fishermen, the cod propagates with astonishing fecundity; it has been calculated that each female carries in its ovary more than nine millions of eggs.[e] The coryphenæ and the chætodons are met with only in the torrid zone. There are various species of these genera, which, on account of their brilliant colours, have received the name of gilt-heads.[f] These are the most active enemies of the flying fish, which, like them, are found only between the tropics, or, at farthest, towards the 40th parallel of latitude. These genera are observed both in the eastern ocean, and in the Atlantic; but probably of different species. We should imagine that the electric fishes are confined to the torrid zone; the electric gymnotus, indeed, belongs exclusively to America; and the "trembler," or the *silurus electricus*, to the rivers of Africa; but the *torpedo*, or cramp fish, is dispersed over all the seas. Our knowledge of the productions and the temperature of the ocean, must, from its vast extent, and its unfathomed depth, be extremely imperfect. On many coasts no fisheries exist, and from those which have been established, on others, little accurate information can be gained. No analysis, even of the magnificent works of Lacepede, would enable us to unfold a correct general view of the subject; and the description of each particular sea is reserved for other volumes of this work.

The migration of fishes is occasioned by their being impelled to seek for shallow water, in order to deposite their spawn. Thus the herrings, coming from the bottom of the frozen sea, proceed every year to the coasts of Ireland, Scotland, Norway, Sweden, Denmark, Hol-

[a] Sellii, Nat. Hist. teredin. Utrecht, 1733.

[b] Insects and worms (*annelides*) belong to one great division of animals, the *Articulated*, but are otherwise distinct; the insects have articulated limbs, the worms none.—P.

[c] Cuvier, Tableau Elémentaire, 452.

[d] Herod. v. 10. Plin. viii. 29-58. Ælian, xvii. 35. Pausan, in Achaicis. Compare Bochart, Hierozoicon, l. iv. c. 13. vol. ii. p. 539, *sqq.*

[e] Cuvier, Tableau Elémentaire, p. 337.

[f] "Dorades."

land, and the United States,[a] as well as to those of Kamtchatka, and the neighbouring islands.[b] It seems to be proved that immense shoals of these fishes mechanically follow the direction of the chains of submarine banks and rocks which they meet with in their progress. The variations, both real and pretended, which these migrations experience, seem therefore to depend upon local causes, which we shall point out in another place. *Tunnies* migrate regularly every year from the Atlantic ocean to the Mediterranean; a fact before observed by the ancients.[c] Besides these annual migrations, which, to a certain extent, are completely ascertained, the currents of the ocean must occasion others which we have not the means of observing. Fishes in general appear to suffer severely from a sudden change of temperature,[d] which leads us to infer that the species which live near the surface of the sea must be confined each within a particular region. On the other hand, the observations of Biot and Laroche, by demonstrating the admirable property of the organs of respiration in fishes, by which they can inhale the more oxygen the lower they descend, seem to remove all limits to the migrations of species which live in the lower parts of the sea.[e]

The fishes of lakes and rivers are still less susceptible of a geographical classification. The genera *cyprinus* and *perca*, of which carp and perch are the representatives, people almost all the rivers of the temperate zones. The sturgeons are found in the smaller inland seas, such as the Baltic, the Caspian, the Black sea. The large species,[f] common in the Wolga and the Danube, is in its turn surpassed in size by the *silurus glanis*, the giant of river fishes. The voracious pike, and some other species, often inhabit subterraneous pools, which communicate with the atmosphere only by small openings. A circumstance more worthy of occupying a place in a general description, is the presence of some sea fishes, such as the *cabelian*, a species of cod fish,[g] in lake Winnipeg, in the interior of North America.[h]

There are some fishes which occasionally forsake their native element: eels traverse the meadows; and upon the coast of Coromandel, a kind of *perch*, *Perca scandens*, climbs up the palm trees.[i] Sonnerat observed fishes which live in warm springs of a very elevated temperature.

Natural history will pardon us for not distinguishing from fishes those equivocal beings which, with the warm blood of the mammiferous tribes, possess a combination of those forms which are equally characteristic of the fish and the quadruped. The whale, the narval, or sea unicorn, the *cachalot*, or spermaceti whale, the *dolphin*, the sea-horse, the *phoca*, or sea-calf, inhabitants both of the land and the water, form, in the progressive improvement of their organization, the link which connects two different orders. Whales are in very few respects distinguished from fishes, and there are phocæ that have been mistaken for otters. The more complete the ossification, and the more the organs are detached, the greater is the sensibility. Phocæ and lamantins manifest some traces of social affection.[k]

As both the cetacea and the mammiferous amphibia require frequently to breathe atmospheric air, it is highly probable that they are confined to certain climates. The phocæ of the South Seas are of different species from those which inhabit the waters of the north.[l] The sea-lion met with in the neighbourhood of Kamtchatka differs essentially from that which swims in the Greenland Seas.[m] The phocæ vitulinæ, which are alleged to exist in the Caspian Sea, and in the lakes of Aral, Baikal, and Ladoga, appear to be a species allied to the otter, and different from the marine phocæ.[n] And thus are we relieved from the necessity of admitting those physical revolutions by which it is asserted that they were brought into those inland waters, as if nature could not produce phocæ every where. The great whale of the Northern Seas, though it formerly entered the Mediterranean,[o] has scarcely been able to approach the equator: the whales of the Southern Ocean are probably of a different race. The large-headed cachalot, which inhabits the equatoreal regions, particularly the Indian Ocean, and from which we procure the ambergrise, differs materially from the great cachalot of the frozen seas.

Among terrestrial animals, reptiles occupy the lowest rank. Their organs are indistinct and imperfectly developed, and some organs they want entirely:[p] a thick shield or a scaly skin envelopes their body; their bones are soft; the vital force, distributed through all their members, has no centre of energy; finally, the parts of the animal, when cut off, are spontaneously reproduced.[q] All these characteristic marks indicate a first attempt of nature, an imperfect disengagement from inert matter. Reptiles, accordingly, appear to increase and multiply[r] in mud, warmed by the vertical rays of the sun: the crocodile of Africa, the gavial of the Ganges, and the different caymans of America, are the giants of the lizard kind. It is in the warmest regions of America, and the oceanic countries, that the serpents roll themselves up in immense coils, or conceal a deadly poison under their fangs. The tortoises, which feed upon the sea-weed at the bottom of the ocean, cover the sands only of equatoreal countries with their numerous eggs.

In creating birds, nature has reproduced the order

[a] Gilpin on the Migration of Herrings, in the Transactions of the American Society of Philadelphia, ii. 786.
[b] Krachenninikow, Descript. de Kamtchatka.
[c] Oppian, Halieutic. III. v. 633, *sqq.*
[d] Provençal et Humboldt, Mémoires de la Société d'Arcueil, ii. 398.
[e] Biot, ibid. p. 487.
[f] Accipenser Huso.
[g] "Le cabeliau," the common name for the cod in France.—P.
[h] Goldson, Remarques sur le Voyage de Fuente, dans Sprengel, Choix des Voyages, &c. iv. 164. (in German.)
[i] Daldorf, Transact. of the Linnæan Society, iii. 62.
[k] The Phocæ, Morses, and Lamantins are properly quadrupeds, with their hind legs so involved in the integuments, as to unfit them for walking.—P.
[l] Pèron, Annales du Museum, xv. 300.
[m] Steller, Nov. Comm. Petrop. ii. 360, 366. Otto Fabricius, Fauna Groenlandica, p. 7.
[n] They are said to be the same as the marine variety of the *Phoca vitulina*, differing only in their smaller size and extreme fatness. Cuvier thinks this assertion not founded on an exact comparison. They, at least, belong to the *genus Phoca*.—P.
[o] Plin. ix. 3.
[p] The serpents have no extremities nor sternum, and the frogs are entirely destitute of ribs.—P.
[q] Bonnet dissected away the eye from a water newt, leaving some of the membranes attached to the optic nerve, and in a short time the eye was completely reproduced.—P.
[r] "Prosperer." It cannot mean what was supposed by some of the ancient philosophers, that they are produced from mud by a spontaneous generation.—P.

of insects, but with more simplicity of structure, and greater power and liberty of locomotion. Their bones, more hard and more numerous than those of fishes and reptiles, mark a more perfect organization. The wings with which they are provided seem to assign to them the whole atmosphere as their domain; but the plumage in which they are clad, and which, like vegetation itself, varies according to climate and temperature, proves to us, that these animals, apparently so free, are still subject to certain geographical laws. Even those whose robust constitution would allow them to disperse themselves far and wide, seem to be attached, both by taste and affection, to the districts where they were born. Thus, the condor, and the king of vultures,[a] which soar above the summit of Chimborazo itself, never forsake the chain of the Cordilleras of Peru and of Mexico: the vulture,[b] and the great eagle, never remove from the ridges of the Alps. The sea eagle, or ospray, is perhaps distributed over the whole of the globe. In the natural order of Passeres, travellers often err, by confounding the foreign species with those of Europe—thus, the *Calaos* of Africa and India differ from our ravens, and the *Manakins* of America are not our tom-tits, though possessing some traits of resemblance. The torrid zone, also, exclusively contains the various species of *Parroquets* common in America,—of *Cockatoos*, found only in the East Indies, —of *Loris*, most beautiful in the islands to the south-west of Asia,—and of *Aras*, which last are all from America. The celebrated *Bird of Paradise* is never met with beyond the limits of a very narrow region of the torrid zone, that is, New Guinea, and the neighbouring islands. Of the birds which cannot fly, every equatoreal region, insulated by the sea, has produced its particular species: the *Ostrich* of Africa and Arabia, the cassowary of Java, of the neighbouring islands, and of New Holland,[c] and the Touyou or Ostrich of Brazil,[d] exhibit, in very distinct species, the same general features of organization. The smaller birds in the tropical countries are adorned with the most splendid colours, their plumage vies with the metallic brilliancy of the insects in the same zone.

The temperate zone of birds reaches in our hemisphere from the 30th to the 60th parallel. Within these boundaries the various genera, and even some species, are no longer confined to regions distinctly marked, and have no particular fixed countries. Besides, man has either transplanted, or drawn in his train with him, as he wandered, several species previously to be found only in one particular country. The most remarkable geographical phenomenon is the annual migration of swallows, of storks and cranes, which, at the approach of winter, abandon the northern countries of Europe to visit Italy and Spain, and even Africa. Some species of swallows plunge themselves into lakes and marshes, where they remain in a dormant state during the winter.[e f]

The frozen zone has few species peculiarly belonging to it; among these is, the *Anas mollissima*, whose nests furnish the eider down. But we should consider this aquatic bird rather as frequenting the shores of the frozen seas. The *Strix lapponicus*, and the *Tetrao lagopus*, live upon mountains covered with perpetual snow.

Each grand maritime division of the globe has its peculiar birds. The *Albatross* flits along upon the waves as soon as we approach the 40th parallel of latitude. The man of war birds, and the tropic birds, never forsake the torrid zone; their species probably differ from the one ocean to the other. The *Penguin* of the Northern Pole differs from the *Manchot* of the South Seas. These birds without wings, may be considered as the last and lowest of the order to which they belong.

We now come to an order of animals much more perfectly organized than any of those which we have hitherto considered. It is particularly interesting to observe the geographical distribution of the various species of quadrupeds in the different zones, and on the two continents. This inquiry has already thrown great light upon the history of the earth, and is connected also with the history of man.[g]

In the migration of animals, we have not so much to attend to their *active* power, or the energy of their organs, as to what may be termed their *passive power*, or their capacity of resisting changes of temperature. Frequently, out of a whole genus, one species only is endowed with this capacity. Another species of animals again owes its extensive distribution solely to the care of man, who knew how to master it, and who carried it along with him to the very extremities of the globe. The external organs of animals undergo great changes, merely in consequence of their domestication —difference of climate produces others not less remarkable. As to wild animals, they are directed in their migration, by the abundance or the scarcity of food. The carnivorous ones find almost every where their natural food, and when it fails them, they have recourse to vegetables; for this reason they must have spread themselves to a great extent. Those which cannot support great cold, have been unable to cross from the old to the new continent, because the only direct mode of

[a] The king of vultures (V. Papa) inhabits the plains and warmer parts of S. America. It is the Condor only (V. Gryphus,) which inhabits the highest mountains of the Andes. According to Humboldt, the size of the Condor has been greatly exaggerated. It is not larger than the vulture of the Alps (Lammer-geyer.)—P.

[b] "Vautour d'agneaux," Lammer-geyer.—P.

[c] The Cassowary of Java and the neighbouring islands, and that of New Holland, are not only distinct species, but of different genera; that of Java is a Casuarius, that of New Holland (the Emeu,) is a Rhea. The Java Cassowary has the head galeated, and the neck bare. That of New Holland has the crown flat, and the neck hairy.—P.

[d] The name Touyou belongs to the Jabiru (Mycteria,) and not to the S. American Ostrich (Rhea, L.) Its native name is Nandou.—P.

[e] Compare Guenau, in Buffon, Histoire des Oiseaux, vol. xvii. p. 857. Daines Barrington, Miscellanies, p. 225. Mem. of the American Academy of Boston, i. p. 494; ii. p. 93. *sqq.*

[f] This opinion has been adopted by many naturalists; and there are many well supported facts, proving that swallows have been found in such a dormant state, and also in caves, hollow trees, &c. The same is asserted of the cuckoo and land rail. Probably the best explanation of these facts, if such, is, that they are accidental. In every case, the birds, though they recovered their animation, did not live long. A dog has been frozen at the London Royal Institution, by a frigorific mixture, and recovered his animation by gentle warmth; but he soon died. Nothing is better ascertained than that swallows regularly migrate from Europe as far as the Senegal, and from N. America to the West Indies. Swallows never moult in England, and it has been ascertained that they moult in February.—P.

[g] Zimmermann, Geographical Zoology, 3 vol. in 8vo. 1768, in German.

communication between these two continents, is that furnished by the arctic ice. There are many different species of animals, whose residence history proves to have anciently been in much colder climates than those which they now inhabit: sometimes the continual inroads of man have either destroyed them or driven them away: sometimes the progress of agriculture, by clearing the forests, has bereft them at once of their range for food, and their place of shelter.

Several quadrupeds, by their almost general distribution, baffle every attempt at geographical classification. These quadrupeds are either in a state of domestication, such as the dog, the ox, the sheep, the goat, the horse, the ass, the hog, and the cat; or in a wild state, as the fox, the bear, the hare, the rabbit, the stag, the deer, the squirrel, the rat, the mouse, and the ermine. Among these animals, however, there are some which do not live in the frozen zone.

The *Dog*, the faithful companion of man, has followed him into every climate; in many countries he is the only domestic animal, and supplies the place of the horse and the ox. Towards the equator, as well as towards the pole, he loses his voice; his barking degenerates into a growling noise. This species is distributed as far as New Holland.[a]

The *Ox* lives as far as the 64th degree, and in Lapland even under the 71st. This animal appears to be a native of the warmest part of the temperate zone of the old continent; it is there that he attains the greatest degree of strength and courage. But in the more humid and cold climates, as Gallicia, Holstein, and Ireland, the ox grows much larger, and the cows give more milk. In Iceland, it is in the valleys lying to the north, and under the 65th degree of latitude, that the cattle thrive best. The cows there have no horns, but yield abundance of milk. The ancient Icelandic colony in Greenland, exported butter, salt beef, and hides.[b] The benevolence of Providence, by rendering this most useful species capable of supporting almost every climate, has thus enabled it to follow man to the remotest boundaries of animated nature.

The *Sheep* and the *Goat* equally support the polar cold and the heat of the torrid zone. Goats are very numerous in Norway and in Iceland. The original race of sheep, the *Argali*, or the *Mouflon*, still exist, if we may credit Zimmerman, in all the great mountains of the two continents. The *Capricorn*, and the *Ibex*, or *Wild Goat*, which are the ancestors of the common goat, inhabit the highest summits of the two continents.[c]

The *Horse*, which did not exist in the new continent before the arrival of Europeans, is spread in Europe, and in Iceland, as far as beyond the polar circle. In Asia the horse is scarcely found beyond the 64th parallel; in America the race has spread to the country of Patagonia, the climate of which, under the 50th degree of south latitude, answers to the climates of the northern hemisphere lying under the 60th parallel.

It appears to us, that there were in the old continent at least *three original races of horses*. The first, and the best proportioned, was originally spread between the 40th and 55th parallels, and probably came from Great Bucharia, from Persia, or even from Asia Minor.[d] The Tartar steeds, and those of Poland and Hungary, seem to have preserved the original form of the breed. In countries that are moderately damp and cold, and where there is rich pasturage, this race has become larger and stronger. The forms which are best developed have acquired that symmetry, and that noble warlike gait which mark the Danish, Norman, and English horses. These, however, have been mixed with the Arabian race. The third variety of the first race is a degenerate breed, produced by the deteriorating influence of a climate excessively damp; we may even trace the different degrees of this degeneracy. The horses of the country of Bremen have their feet worse made than those of Holstein and Jutland. As we proceed to East Friesland, their shape grows more and more clumsy.

The second race is small, and sometimes almost dwarfish; its characteristics are a compact square form, endowed with great strength, and surprising agility. It appears to derive its origin from the northern upland plains of Asia, from the steppes of the Kirghises, although Pallas looks upon the wild horses of these countries as having come from the studs.[e] This race, according to some accounts, appears to be spread in the north of India,[f] in China, and in the islands of Japan. It is more certain that the breed is common in Russia and in Scandinavia. The Norwegians introduced it into Iceland and Scotland. It exists in the Danish island of Zealand.

The third race of horses is possessed of the most showy properties, being extremely swift, supple, vigorous, and mettlesome. We mean the *Arab race*, which undoubtedly has a common origin with that of Barbary, if it has not given birth to it. The Andalusian horses are its lineal descendants. The English say that their race horses are directly sprung from crossing the Arab with the Barb. History proves, that the Romans, the Saxons, the Danes, and the Normans, by introducing into Britain the various races of their respective countries, laid the foundation of the English breed. Private persons afterwards, from time to time, imported Arabian and Barbary stallions.

The *Ass*, though far from being reckoned a very delicate animal, does not support cold so well as the horse. In Europe, it is rarely seen beyond the 52d parallel; and we do not believe that it can propagate at 60 degrees of latitude. The climates most favourable to the ass are those between the 20th and 40th parallels. There he grows large and handsome, is lively and do-

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[a] Collins' Account, &c. p. 567.

[b] Speculum regale, 188, 191, 200. See the account of ancient Greenland in our first volume, (Hist. de la Geog. vol. I. p. 391.)

[c] Species of Wild Sheep and Goats inhabit the Rocky Mountains (N. America.) The former (Ovis montana) have no specific difference from the Argali of the old continent. The latter (Capra montana) is probably a distinct species. It has, under a coat of long hair, another of short wool equal in fineness to the Cashmire.—P.

[d] See the passages collected together by Bochart, Hierozoicon, I. ii. ch. 9.

[e] Pallas, Voyages, i. p. 376, in 8vo.

[f] Pennant, Outlines of the Globe, ii. 239.

cile, and is treated with kindness.[a] The wild ass is now found only in Tartary, where it never goes beyond the 48th degree of latitude.

The history of the *Hog* throws great light upon that of man. This foul animal is to be met with throughout the whole of the ancient continent, beginning at the 64th parallel of northern latitude. The *wild boar* is not found beyond the 60th degree. In the New World there were none of these animals, previously to its discovery by Columbus; they have been brought into it, and they live there from the 50th northern parallel to Patagonia. The hog is distributed over almost all the islands of the Great Ocean, where it is the chief domestic animal. Is it not evident from this single fact, that the islands of the Pacific Ocean have received their inhabitants from the south-east of Asia? We may, with equal justice, conclude, that had there been formerly a communication between America and the people of the ancient continent, this must have taken place either at a period when man did not reckon the hog in the number of domestic animals, or under latitudes more northerly than those in which this animal can exist.

The *Cat*, now distributed over the whole globe, was not met with as a native of America. As this animal must have always accompanied navigators, its original absence in America greatly invalidates the pretended accounts of the Carthaginians, and especially the opinion that the Japanese maintained frequent commercial intercourse with the north-west of America. The cat, however, existed upon several islands of the Pacific Ocean before the arrival of Europeans.[b]

The species of wild animals spread over all the climates of the two continents are very few; it is even doubtful whether there are any, except those which have been introduced into the new world by man.

Of all the wild animals, the *Fox* is perhaps the most extensively distributed, and most easily assimilates to every climate. Vast troops of foxes inhabit Nova Zembla, and the shores of the Frozen Sea; and they are not less numerous in Bengal, in Egypt, and upon the coast of Guinea. The New Continent, says Zimmermann, is filled with them, from the northern parts of Greenland, under the 78th degree, as far as to Mexico, and from Mexico along the Cordilleras to the straits of Magellan. But travellers have applied this name at random; we have no satisfactory proof that there are any real foxes in South America.[c]

Animals similar to the *Hare*, are found equally in Siberia and on the banks of the Senegal, upon the coasts of Baffin's Bay, and over all the New Continent. But Buffon has expressed his doubts as to the identity of the American hares with those of the ancient continent; it does not at least appear that any real hares have been seen in South America. It is said that those of Greenland differ from ours only with respect to their hair, which remains always white.[d] The hares of that arctic country appear, however, to be of the species *Lepus variabilis*, which is known only in Siberia.[e f g]

The *Squirrel*, according to Zimmermann, inhabits every part of Europe and Asia, from the extremities of Siberia to the kingdom of Siam, and is to be met with in Africa and the two Americas. But it appears that in every region of the world the species are different.

The *Rabbit*, being unable to live in the open air of the climate of Sweden, could not have emigrated into the New Continent by the countries in the neighbourhood of the pole. All the rabbits that are seen in the New Continent, have been brought thither by colonists, and have afterwards passed from the domestic to the wild state.[h]

The *Stag* appears to be indigenous to both continents. It inhabits Europe as far as the 64th degree, and Asia to the 55th, and in some places even to the 60th degree. It is therefore difficult to conceive how it could have passed into America, as Zimmermann supposes. The stag of Canada,[i] having horns without palmatures,[k] should, we apprehend, be considered as a distinct species.[l] Zimmermann also endeavours to prove, by numerous testimonies, that the stag is to be met with in the islands of Java, Sumatra, and Ceylon, as well as in Abyssinia, Guinea, and Barbary. But, in the first place, the stags in the islands to the south-east of Asia, in general imperfectly described, now appear to belong to the species *Cervus axis*, and some of them perhaps to the *Antilope oryx*.[m n] And as to the existence of stags in Africa, since it is altogether denied by the ancients,[o] and insufficiently established by modern authorities,[p] it is probably confined to a few herds which had strayed from Asia, or perhaps broke loose from some royal or proconsular park.

Shall we place the *Common Bear* in the number of animals which are spread over the whole of the globe? Zimmermann finds it in all latitudes, from the polar circle to the equator, and beyond it; but in the accounts which he quotes, we cannot always distinctly ascertain what variety is referred to.

The *Black Bear*, which is the largest, appears to be met with in both continents. Its existence in Northern

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[a] De Grandpré, Voyage au Bengale, ii. 229. Niebuhr, Description de l'Arabie. Bochart, Hierozoicon, lib. ii. ch. 13.

[b] The Cat was not found originally in the eastern islands of Polynesia; but some of a diminutive size were said to have been found in the Pelew islands.—P.

[c] The three-coloured Fox (*C. Tricolor*) is said by Cuvier, to be found in all the warm and temperate parts of America.—P.

[d] Otho Fabricius, Fauna Groenlandica systematice sistens animalia Groenlandiæ Occidentalis, hactenus indagata. Copen. 1780.

[e] Linné, Système, edit. 13. Gmelin, i. p. 100.

[f] The *Lepus variabilis* is found in the mountains of the more northern countries in both continents, and, according to Cuvier, in the high mountains of S. Europe.—P.

[g] Two species of Hares are said to be found in N. America; the *Lepus glacialis*, larger than the *variabilis*, found within the Arctic circle; and the wild Hare of the U. States and Canada, either the *variabilis*, or a distinct species (*L. virginianus*.)—P.

[h] The wild Rabbit of N. America is a distinct and original species (*L. Americanus*.) It is very doubtful, if the European Rabbit, although common in a domestic state, has ever run wild in N. America.—P.

[i] The Stag of Canada (the American Elk or Wapiti,) is a distinct species (*C. Canadensis*.) The common Deer of N. America is another peculiar species (*C. virginianus*.) There is another species on the Missouri, called by the hunters Mule Deer (*C. Macrotis*.)—P.

[k] "Empaumures." The top of the horns of the stag, where there are 3 or 4 palmated antlers.—P.

[l] Comp. Cuvier, Tableau Elémentaire, p. 160.

[m] Valentin, quoted in the article Celebes.

[n] The *Antilope oryx* is said, by Cuvier, to inhabit the interior of Africa. The *Cervus muntjac* or Indian Roebuck is found in flocks in Java and Ceylon.—P.

[o] Herod. iv. 192. Comp. Plin. Arist. &c. apud Wesseling, ad Herod loc. cit.

[p] Gataker, Miscellan. l. ii. cap. 8 Shaw's Travels, i. 170, quarto ed.

Africa has been clearly proved ;[a] but the animals in America to which this name has been given, are not accurately described. As to the *Brown Bear* of the Alps, we shall assert nothing. It exists, without doubt, in Siberia, but it is not met with in the Aleutian Islands, and is rarely seen upon the coasts of the Frozen Sea, the abode of white or sea bears. As to the small bear, which the Norwegians name *myre-biorn*, or marsh bear, it seems to be a peculiar variety, confined within very narrow limits.[b]

We have still to consider the geographical distribution of some small animals, concerning which we are extremely liable to err.

The *Ermine*, or weasel, with a black muzzle, according to Zimmermann, is a native of every climate, being found in the Molucca Islands, in Guyana, and in Africa, as well as in Siberia, Lapland, Newfoundland, and Canada.

Rats and *Mice*, those troublesome parasites, embark on board our ships, and cross with impunity the equator, as well as the polar circles. It is to navigation that we must ascribe the extensive distribution of these two kinds of animals. On land, however, neither rats nor mice can support the cold of the frigid zone ; there are none of them in Greenland, nor in the most northern part of Lapland ; and in Siberia they are never observed beyond the 61st parallel.

From the preceding observations, we may draw the conclusion, that it is not yet certainly demonstrated that any species of animals, perfectly identical, has been distributed by nature over all the regions of the globe. In similar climates the organizations have assumed characters which nearly approximate, but never exactly coincide.

There are some quadrupeds, which, from their capacity of supporting a very great degree of cold, are distributed in both continents without having ever passed the tropics; they belong to the cold part of the northern temperate zone.

The *Rein Deer*, of all known terrestrial animals, has its range nearest the pole. In Scandinavia, it can scarcely exist to the south of the 65th parallel ; in Russia, from the greater coldness of the climate, it is found under the 63d ; in Asia, it descends still lower, and roves into Chinese Tartary, among the Tunguses, beyond the 50th degree. This oblique line, drawn from Lapland to the land of Yesso, is very remarkable, because it nearly designates the physical frozen zone of the ancient continent.[c] The rein deer finds only within this line the species of moss,[d] on which it lives. As the new continent is, if not colder, at least more uncultivated than Siberia, the rein deer, or the *karibou* of Canada, which is the same animal, descends as low as the 45th parallel. The animal which has been termed the *Greenland stag*,[e] is only a rein deer.

The *White* or *Polar Bear*, an animal totally different from the common bear, and much more formidable, inhabits all the coasts of the frozen sea, and can cross from one country to another upon the floating ice. This mode of conveyance would be still more common to smaller animals. Hence the migrations of the different kinds of polar animals do not prove that the two continents were formerly contiguous. A bridge of ice, such as Cook found, is sufficient to account for these migrations.

The *Isatis*, or *Polar Fox*, an animal different from the common fox, appears to like the cold more than the rein deer, or even the white bear ; for the bear retires, or conceals itself at the approach of the polar night ; and it is only then that the isatis makes its appearance. This animal is not confined to the immediate vicinity of the pole, it advances as far as the Aleutian Islands and Kamtchatka on one side, and on the other to Iceland and Lapland.

Some other species, which could swim, may have passed over by the Aleutian Islands, or by Behring's Straits. Among these the river *Otter* should be named, which is found upon the old continent, from the 70th degree, to about the 20th, in the kingdom of Siam ; but in the European countries on the shores of the Mediterranean, it is scarcely ever seen, having been probably expelled in consequence of the cultivation of the soil. In the new world, its principal range is between the 50th and 40th parallels. The *Marsh Otter* is confined to a still narrower range in the ancient continent, viz. the space between the 65th and 50th parallels of northern latitude. The *Marine Otter* seems to prefer the coasts of Kamtchatka, and the north-west of America, from the 65th to the 40th degree.[f]

The industrious and peaceful *Beaver* was once, perhaps, a native of all the countries of the globe, or at least of the whole of the northern temperate zone, for their habitations existed in Italy, in Persia, and in Egypt. This half civilized race of animals has been extirpated by man. In the new world, we still find small communities of beavers, from the 60th to the 30th northern parallel. But even in the deserts of Canada, they have withdrawn to a great distance from the residence of man.

To the *Marten* is assigned about two-thirds of the northern temperate zone, beginning at the 67th degree in Europe, the 64th in Asia, and the 60th in America. Zimmermann alleges that it is to be met with in Madagascar, in the kingdom of Anziko, and in Guyana ; but the only circumstance which has been proved is, that the marten, properly so called, as well as the valuable *Sable Marten*, is dispersed over the Aleutian Islands, where the Siberian marten is never to be found.[g]

The distribution of some other kinds of animals is uncertain. The *Lynx*, that tiger of cold climates, lives to the south of the polar circle ; in the ancient continent, he appears as far south as the Pyrenees, and in

[a] Salmas. Exercit. Plinian. 220. Shaw's Travels, i. 177. Larcher, Histoire d'Herodot. iii. p. 488—490.

[b] According to Cuvier, there are three decided species of Bears, the Brown, the Black, and the White or Polar Bear. The former is fierce and carnivorous, and inhabits all the forests and mountains of Europe, the greater part of Asia, and the N. of Africa ; and it is said, the western parts of North America. The second species is a native of North America ; is smaller, gentler, and rarely feeds on flesh, unless when pressed by famine. There are, besides, a black bear in Europe, and another in India, which Cuvier considers distinct species. The Grisly Bear, of the Rocky mountains, is decidedly a peculiar species (U. Cinereus.) It is extremely ravenous.—P.

[c] Georgi, Description de la Russie, iii. 1610.

[d] Lichen Rangiferinus, L.

[e] "Daim de Groenland," Greenland Fallow Deer.—P.

[f] Georgi, Description de la Russie, iii.

[g] Georgi, Description de la Russie, iii. 1533, *sqq.*

Mongolia. We are but imperfectly acquainted with those animals of the new world, particularly of Carolina and of Northern Mexico, to which the name of *lynx* has been given.[a]

The *Elk*, an animal which is every day becoming more rare, seems to dread extreme cold, since in Europe it very seldom passes to the north of the 64th parallel; on the other hand, it is never found to the south of the 52d degree. In Asia, the farther we advance towards the east, the more does it range to the south. The American elk, though not much different, appears to belong to a particular race, as the genuine elk of Asia does not pass Kamtchatka and the Kurile Islands.[b] The region of the elk in America begins under the parallel at which it terminates in Europe, that is, to the south of Hudson's bay, and extends to New England, or perhaps in the interior as far as to the Ohio.[c]

The *Flying Squirrel* never ventures farther either north or south, than the limits of the fir forests in which it makes its abode.[d] The *Mountain Rat*[e] follows in Europe the chain of the Alps and the Carpathian mountains. It does not exist in Scandinavia, but is to be seen in Poland, and the Ukraine. It is found at the mouth of the Don, and probably in Caucasus; it inhabits the Ural mountains near the river Kama, and from thence the race has been propagated as far as Dauria. In the new world, this animal is found from Canada to Virginia, and even upon the Bahama Islands.[f] The *Badger* and some other small animals inhabit equally the northern half of the temperate zone; but the identity of these species is neither established nor disapproved in a manner quite satisfactory.

The quadrupeds which exclusively belong to the one or the other of the two continents, are in general such as are unable to support the cold which prevails beyond the 60th parallel. The *Lemming* however, a species of mouse, which often migrates, in vast numbers, from one country to another, inhabits the whole of the frozen zone of the ancient continent, but has not been discovered in America. The animal named the *Musk*, resides in the mountains of Asia, from Cachemire and the Altäi, to the mouths of the river Amur; it is not spread over any part of the new world. There are still some exceptions less remarkable.

Certain animals appear to be attached to the confines of the torrid and the temperate zones.

The *Camel* with two humps seems to have originally come from Bactriana, or Great Bucharia.[g] It lives in European Turkey, in the Crimea, and among the Kirghises and Bashkirs, under the 55th degree of latitude, and in a very rigorous climate.[h] We find it even throughout the whole of Songaria, in Mongolia, and in the country of the Mantchoo Tartars, where the winter begins in September and ends in May. The camel does not advance farther than the 28th degree, in China and India. It cannot exist in the peninsula of Hindostan; but in Arabia it has been inured to live nearer the torrid zone.

The *Dromedary* or camel with one hump, well known for its fleetness, appears to have come from Arabia,[i] or Africa. It has been carried as far as Southern China; but it thrives best in Africa, where it is to be met with in Egypt, in Barbary, on the banks of the Senegal and the Gambia, in Nigritia, and even in Guinea and Abyssinia. We had conjectured that it was an inhabitant even of the centre of Africa;[k] the English journals announce, that it was lately observed to the north of the country of the Booshooanas, under the tropic of Capricorn; but the account which they give requires confirmation.

Both kinds of camels appear to be chiefly attached to that long tract of mountainous country, and naked elevated plains, which traverses the whole of the old continent, and on which they find saline plants, such as the *salsola*, the *statice*, the *artemisia*, the cherry of the steppes, and the *Cytisus hirsutus*, which serve for their ordinary food.

The nimble *Chamois* loves the mountains of the temperate zone, the tops of the Pyrenees, the Alps, the Apennines, the Carpathian mountains, Caucasus, and the country of Siberia, to the banks of the Ischim.

The *Antilope saiga*, and the *Antilope gutturosa*,[l] inhabit the upland plains of Tartary; the former is found as far as the 53d parallel. The *Gazelle*, with its mild and brilliant eyes, prefers the more southern countries; a native of Caucasus, along with the chamois, the gazelle extends its range as far as Arabia, and across the whole of Africa to Senegambia. It is to be met with in the southern temperate zone, and in Cafraria, together with a great number of other species of antelopes. The race of *antelopes* follows, like the camels, the great upland plains of the old continent. There are species however, which appear to be peculiar to the cold temperate zone.[m]

The *Jackal* lives, according to Zimmermann, in Turkey, in Barbary, in Bengal, and in general in the countries of Asia and Africa situate between the 43d and 8th degrees of northern latitude. But an animal which lives so near the line may certainly pass it; the supposed wolves of Congo and of Cafraria appear to us to be jackals.

The *Buffalo*, commonly regarded as originally coming from the torrid zone, has been domesticated, and car-

[a] Cuvier gives two species of Lynx, natives of N. America, (F. Canadensis and F. Rufa,) as distinct from the Lynx of Europe, (F. Lynx.)—P.

[b] Georgi, Description de la Russie, iii. 1607.

[c] The Moose Deer of N. America is considered as belonging to the same species with the Elk of Europe and Asia *(C. Alces.)* The Elk of N. America is distinct *(C. Canadensis.)*—P.

[d] Cuvier gives four species of Flying Squirrels (Polatouches;) that of Northern Europe and Siberia (S. Volans;) that of N. America (S. Volucella;) and two from the E. Indian Archipelago (S. Petaurista, and S. Sagitta,) the former nearly as large as a cat.

[e] Marmot, Arctomys, Linne.—P.

[f] The Marmots of N. America differ specifically from those of the old continent, *Arctomys Alpinus*, *A. Bobac*, and *A. citillus* (the souslic or zizel.) Eight or ten species are given in N. America. The most common are, the Woodchuck *(A. Monax.)* the Prairie Dog *(A. Ludoviciana.)* and the Missouri Ground Squirrel *(A. tridecim-lineata.)*—P.

[g] Arist. Hist. Anim. cap. 1. Plin. viii. 18. Bochart, Hierozoicon, lib. ii. cap. 4. p. 87—89.

[h] Pallas, Voyages en Russie, ii. 302. *sqq.* iii. 20. *sqq.*

[i] Bochart, l. c.

[k] Géographie de toutes les parties du Monde, publiée par Mentelle et Malte-Brun, i. 518.

[l] Dseren of the Mongols; Hoang-yang or Yellow Goat of the Chinese.—P.

[m] Only one species of Antelope has been found in N. America, the prong-horned Antelope *(A. Americana.)* It inhabits the great plains on the Missouri and Columbia rivers.—P.

ried as far north as the 46th degree, both in Europe and Asia. It is probable that the *bonasus* described by Aristotle, and which lived wild in the mountains of Pæonia, a district of Thrace, was a species of buffalo.[a] There are two other species which occupy each a separate tract of country. The *Grunting Ox*, or the *Yak*, inhabits the upland plains of Mongolia and Thibet. The *Buffalo of Cafraria*, appears to be spread over all Africa; for why should we not refer to this species all the ancient accounts[b] of bulls of a monstrous size, carnivorous, and objects of terror both to men and animals, which were alleged to have been seen in Upper Ethiopia, that is, in Sennaar and Abyssinia, and to which Philostorgus gives the name of *bull-elephants*?[c] These accounts have been confirmed by the evidence of modern times.[d] The species with moveable horns, indistinctly noticed by the ancients, appears to have been rediscovered upon the Mozambique coast. It is possible that we shall yet meet with the oxen and buffaloes of the Garamantes, whose horns pointing towards the earth, forced them to move backwards as they fed.

The numerous family of *Apes* gambol in the forests between the tropics, and show rather a dislike to the temperate climates, at least in their wild state. The apes that have run wild on the rocks of Gibraltar, have propagated in that situation, but they have degenerated.

As the word *ape* has been taken in a very generic acceptation, it is said that this animal, though confined to the torrid zone, is equally to be met with in the two continents; but, if we carefully distinguish the various species, we shall perceive that there are none of them common to both.

There is a very distinct line of demarkation between the country occupied by the *Monkey*, the *Baboon*, the *Mandril*, the *Jocko*, and the other apes of Africa, and that inhabited by the real *Ourang-outang*, the *Gibbon*, and the *Wouwou*, animals which most nearly resemble the human figure, and which, as they are met with in the islands of Borneo and Java, may have come at first from New Holland or New Guinea.[e] Even in the tribe of *Makis*, there are limits marked to each species: the *Loris* and *Tarsiers* belong to the East Indies; the *Galagos* to Senegambia; and the *Makis*, properly so called, to Madagascar.[f]

The *Giraffe*, or the *camel leopard*, so remarkable for its height, its swan-like neck, and its gentle manners, seems to belong only to one region of Africa, namely that which extends in length from Cape Guardafui to the Cape of Good Hope, and to which should be joined the mountainous plains, which probably occupy all the interior of Southern Africa, between the sources of the Nile and those of the rivers of Congo, Benguela, and Monomotapa.[g]

This region, which is almost unknown, with the exception of the maritime parts, seems to be very prolific in different kinds of animals. Here, two sorts of asses, the *Zebra* and the *Quagga*, are to be met with, and the wild boar in his greatest strength; and here also we shall probably find many of our domestic animals in a wild state, as well as on the central plains of Asia. As this region of Africa enjoys but a moderate degree of warmth, the camel leopard appears to be confined to it, less by the climate than by its own extreme timidity. It is seen as far as the twenty-eighth degree south, but only on the eastern coast.

The two varieties of the *Rhinoceros* have, each of them, its own country. That with two horns inhabits only South Africa, beginning at Congo and Abyssinia. The other, with one horn, is found in the East Indies, and in China; in this latter country the rhinoceros ives to the thirtieth degree north. They have on the other side of the line spread as far as the islands of Sunda. Some accounts would persuade us that the rhinoceros with one horn exists in Monomotapa;[i] but this is probably a distinct species.

The *Hippopotamus* is now confined to Africa; it lives in all the great rivers of that quarter of the world, and is seen in great numbers near the Cape of Good Hope.

The *Elephants* of Africa and Asia are of two different races, which have probably not intermixed; for the Asiatic elephant inhabits only India, China, as far as thirty degrees, and some islands to the south-east of Asia, to which he has been transported by man. In Persia and in Arabia, we find no elephants but those which have been brought from other countries; and we know that the animal never propagates in the domestic state. The African elephants do not advance farther north than the 20th degree; from thence to the Cape of Good Hope they are every where met with in great numbers.

The *Lion*, the powerful and formidable king of quadrupeds, has been stripped of a great portion of his dominions; for, in the age of Homer, and even in that of Aristotle, the inhabitants both of Greece and of Asia Minor, were accustomed to fly from his approach.[k] From profane and sacred history, we know that there were lions in Armenia, in Syria, in Palestine, and in Egypt. In none of these countries does the lion now appear. This dreadful animal has been taught to dread the arms of man; he has retired into those countries where there are fewest inhabitants; he roams in the deserts of Arabia, from whence he extends his ravages to the environs of Bagdad. The lion is to be met with, according to Zimmermann, in the mountains of Hindostan, and upon the coast of Malabar, upon the Gauts of India, and even in the islands of Sunda, and the

[a] Arist. Hist. Anim. ii. cap. i. 9. ix. cap. 45. de part. animal, iii. 2.

[b] Agatharchid. ap Phot. Biblioth. cap. 39. Strabo, Geog. xvi. p. 533. edit. Casaub. 1. Plin. viii. 21. (we must distinguish the oxen of India with very large horns, Plin. viii. 45. Ælian, Hist. Anim. xvii. 45.)

[c] These large cattle (Taur-elephantes) were probably a variety of the common buffalo *(Bos Bubalus.)* Travellers represent the Buffaloes of Abyssinia, as equal in size to the largest oxen, with a black naked skin like that of the Elephant. There is another variety in India, the Arni, considered by Shaw as a distinct species, whose horns measure ten feet from tip to tip.—P.

[d] Ludolf. Comment. ad Histor. Æthiop. i. cap. 10. iii. cap. 11.

[e] The tribe of Apes (Simiæ, Linn.) are divided into two great families, the Apes of the old continent, and the Sapajous of America. The former include the Orangs, nearest the human form, the *Guenons* or tailed Apes (Monkeys,) the Baboons, the Mandrills, and the Pongos—the latter, the Sapajous with a prehensile tail, and the Sakis with the tail not prehensile. The Ouistitis, a small tribe resembling the Sakis, are found only in S. America. They are very small and elegant animals, and were formerly classed with the Apes. (Cuvier.)—P.

[f] Cuvier, Tableau Element. p. 94. *sqq.*

[g] The Cameleopard is found in the open plains in the North of Central Africa, in Darfur, Bornou, and Soudan.—P.

[h] There is a two horned Rhinoceros in Sumatra, a distinct species, (Cuvier.)—P.

[i] Thomann's Voyage and Biography, in German, p. 118.

[k] Herod vii. c. 126. Arist. Hist. Anim. vi. c. 31.

kingdom of Siam. This appears to be extremely improbable. Africa always was, and still is, the country most celebrated for an abundant breed of lions, notwithstanding the numbers carried away by the Romans for their sanguinary sports. The lions which roam in the elevated but burning plains, beyond Mount Atlas, are the most distinguished for strength and courage.

The *Tiger*, less extensively distributed than the lion, approaches nearer the pole, if it be true that Tournefort saw some of the species upon Mount Ararat. The Russian writers allege, that a stray tiger is occasionally observed roaming as far as Mongolia, and on the banks of the Ischim, in Siberia.[a] They are found also in eastern Persia, and in China; but the climates in which they attain the greatest size, and display most ferocity, are those of Bengal, the Deccan, Malabar, Siam, Pegu, Ceylon, and Sumatra. It is in these countries that the *royal tiger*, a fit favourite of oriental despots, gets glutted with the blood of the slaves who are consigned to his fury.

Africa contains no genuine tigers; but, by way of compensation, it has *Panthers* and *Leopards*, two species that are sensibly distinguished only by their spots, these being more beautiful and more perfectly rounded in the leopard, which chiefly inhabits Guinea and Senegambia.

The *Ounce*, which differs from the panther in the gray colour of its hide, and the superior mildness of its nature, is more widely distributed, as it is found throughout the whole of Barbary, in Arabia, in Tartary, and China, and sometimes makes its appearance near Kutznesk in Siberia.

From this sketch of the geographical distribution of animals peculiar to the ancient continent, the following general inference appears deducible, viz. that the *interior of Asia, and that of Africa, have been each of them the native region of a certain number of species of animals.* The tiger, the Indian elephant, the camel with two humps, the wild sheep, the *Koulan* or wild ass, the *Dchiggetai* or horse ass, the grunting ox, the elk, and the musk, are the animals peculiar to the central upland plains of Asia. Those which are characteristic of the eastern upland plains of Africa, are the lion, the African elephant, the dromedary, the buffalo of Cafraria, the zebra, the quagga, and monkeys. We cannot help thinking, although on evidence which we admit to be weaker, that the northern upland plain of Africa, or Mount Atlas, the western upland plain of Asia, or Taurus, and the centre of Europe, or the Alps, have equally had their indigenous races of animals. If the two great masses of the old continent have produced each of them its own races of animals, why should not the new world have also races of its own? Why should the majestic chain of the Cordilleras of Mexico and of Peru, have been more excluded from the general action of vital energy than the central upland plains of Asia and Africa?

Nothing can be more natural than to suppose that the vast and isolated continent of America had also its peculiar creation. The very few animals which were able to pass from the one continent to the other by the north, could scarcely have traversed the very hot climates in the central parts of America. South America at least, then, would have remained wholly desert, had not nature, which leaves no spot unpeopled, furnished the new continent with species of animals entirely unknown to the ancient world.

Among the animals which peculiarly belong to North America, we think, may be reckoned the great elk, named the *Moose-deer*, as well as the great stag of those countries; species which, to the eye of a mere naturalist, would appear only as varieties of families found in the ancient continent, but which physical geography pronounces to be originally different, by showing the extreme improbability of their supposed passage from Asia to the north-west coasts of America. The bears, the lynxes, and the ounces of the United States, are probably as different from the animals of the same name in the old continent, as the squirrels and hares are upon which they feed.

The *Bisons*, or humped bulls, are the largest quadrupeds in the new world: they roam in great herds from Hudson's Bay through the whole of Canada, the western territory of the United States, and Louisiana, to New Mexico, and as far as the shores of the Gulf of California; that is, from 52° to 33° of north latitude. They differ from the *zebus* of India, and from the *urus* of Europe; but the thick wool which clothes their back and neck, as well as the beard that covers their chin, remind us, it must be confessed, of the *bison*, described by the ancients as an animal inhabiting Scythia.[b]

Mention is made of a *Musk ox*, which inhabits the extremities of America, between the Welcome, Baffin's Bay, and the Copper Mine River. According to other accounts, it wanders as far as the Pacific Ocean.[c] It is alleged to be a species of buffalo, but the accounts are still very vague as to this point.[d] The Mexican stag is to be met with in both Americas, so that we cannot ascertain its native country; but the animal resembling a large sheep, which has been observed to the north of California, appears to be different from the analogous species which browse in Peru.[e]

The *Yaguar*, the tiger of the new world, resembles the ounce in strength, and the panther in skin. Zimmermann proves, from the narratives of modern travellers, that there are some of the yaguars which equal the tiger in size.—The *Puma*, or the *Couguar*, which has been called the American lion, has a body more nearly resembling the wolf, and a head like that of the leopard of Guinea. These are two species quite unknown to the old world. The yaguars supposed to have been seen in Mexico, were probably either ounces or lynxes. It is equally doubtful whether this animal has advanced as far as the cold country of Patagonia. The *couguar* is not distributed farther than the 45° of south latitude.

The *Lama* or *Guanaco*, which has been improperly

[a] Georgi, Description de la Russie, iii. 1519.
[b] "Villosi *terga* bisontes." Sen. Hippol. v. 64.
[c] P. Marco de Niza, quoted by Zimmermann, Almanach de Voyages, 1806. p. 73.
[d] The Musk ox has been found only in the most northern parts of N. America, on the shores of the Icy Sea. It is a very peculiar species and has been made a distinct genus (Ovibos) by Blainville.—P.
[e] The former (Ovis Montana) is a true sheep; the latter (the Vicunna) is a *Lama*.—P.

named the camel of the new world; and the *Paco*, which in its domestic state is called *vicunna*, or vigonia, or Peruvian sheep, inhabit Chili or Peru, to 10° south latitude; they are distributed neither in the plains of Tucuman, nor in those of Paraguay.[a]

The *Tapir*, the largest quadruped of South America, although it is only the height of a cow; the armadillo, the tajassou, the ai or sloth, the *Fourmilier* or ant-eater, the *Tamanoir*, the different *Agoutis* and *Coatis*, species, all of which acknowledge South America as the place of their nativity, do not in general spread beyond the tropic. The tajassou, however, according to some accounts, is found in Chili. The small long-tailed apes, the *Sapajous*, the *Tamarins*, the *Sagouins*, and other similar species, are very numerous, very various, and very pretty over all the torrid zone of America; they essentially differ from the apes of Africa and Asia.

On the confines of the temperate zone, we observe stags of different species, the beaver of Chili, various *Caviais*, similar to hares, and, according to Molina, the horse with cloven feet.[b] The species which exclusively belong to the New Continent, are, as we have seen, very numerous; but they are of a much smaller size than the analogous species which live under the same latitudes in the ancient world. Physical geography informs us of the causes of this peculiarity. Do we not know the peculiar configuration of the American continent? Mountains cold, and partly barren, are immediately succeeded by marshy forests, and plains continually inundated. The torrid zone in America affords but a small extent of land; the temperate zone of the North is encroached on by cold marshes; in that of the South, the continent tapers almost to a point. Thus, throughout the whole of this continent, the larger species of animals are either strangers to the climate, or have not room for the full development of their energies. On the other hand, imported animals which agree with the climate of America, lose nothing of their size, their beauty, or their strength. The horse and the ox have not in the least degenerated in the extensive pastures of Paraguay. If the human race appears to have undergone deterioration in America, this should be ascribed rather to political than to physical causes.

If reptiles and insects abound in America, if they there attain a larger size than any where else, it is only when considered relatively to the known regions of Africa. These regions, peopled from time immemorial, have seen their primitive animals fly before the face of man; but who knows whether the unexplored interior of that continent does not contain extensive marshes, as thickly peopled with reptiles and insects as the coasts of Guyana? Does not, moreover, the Delta of the Ganges swarm with serpents of enormous size?

The distinctive character of South American zoology consists then, principally, in the difference of species, a difference which proves how little intercourse this great peninsula has had with the rest of the world; it has not received any species even from North America, while the latter country has beheld the number of its animals augmented by accessions from those of South America.

We have still to consider another province of the animal kingdom, a province hitherto imperfectly explored, but certainly very distinct from those which we have already examined. The islands to the South East of Asia, as well as the great island of New Holland, occupy a position very similar to that of South America. In them, therefore, should be the cradles of races of animals very different from those of the two Continents. These races, however, are far from being plentifully distributed in the remainder of that vast archipelago, which is placed in the centre of the great ocean. We do not find there the *Ornithorinchus*, nor the *Wombat*, nor the *Opossum*, nor the *Kangaroo*, animals peculiar to New Holland. We must, however, remark that these species resemble the didelphises,[c] which are common in the neighbouring islands of Asia, that *opossums* are met with in the Moluccas, that in Java, there are *Kangaroo-philanders*, and that, if the flying phalanger resides in New Holland, the white phalanger inhabits the island of Amboyna.[d] Labillardiere found the lizard of Amboyna in the Friendly Islands. We may add, that the *Cassowary* belongs equally to the Molucca Islands, to Java, and New Holland; and, without waiting till it be discovered whether there exist in that great island, the *Babiroussa*, or stag hog, the *Cervus axis*, the *Ourang-outang*, and other mammiferi of Borneo, the Philippines, and the Moluccas, we may consider the fifth part of the globe, or the Oceanic countries to the south east of the Chinese sea, as the native region of an assemblage of animal tribes, of which future discoveries shall increase the number and unfold the relations.

These general views of the geographical distribution of animals, however imperfect they may be, may assist our readers in classifying the numerous details of our subsequent and particular descriptions of regions and countries.

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[a] Helms, Voyage de Buenos Ayres à Lima. Azara, Quadrupedes de Paraguay.

[b] The cloven-footed Horse of Molina is not admitted by the best naturalists of the present day. It was most probably founded on mistake.—P.

[c] The term Didelphis (Linne) is common to the whole family of pouched animals (*Marsupialia*.)—P.

[d] The *Marsupialia* are distinguished by the premature delivery of their young, which are then inclosed in a kind of pouch, at the lower part of their abdomen, formed by folds of skin, and supported by two peculiar bones attached to the pubis. They remain there, adhering to the teats, till they have reached the ordinary development of fœtuses at birth. Although they agree in this peculiarity, yet they differ very much in the arrangement of their teeth, so as almost to form a scale parallel with the general scale of quadrupeds. They include the *Sarigues* or *Opossums*, all natives of the warmer parts of America—the Dasyures, and the Perameles of Australasia—the Phalangers of the Moluccas and New Holland, and the Flying Phalangers peculiar to New Holland—the Kangaroo Rat of New Holland—the Kangaroos of New Holland and the Moluccas—and the Phascolome or Wombat of New Holland.

The *Monotremes* resemble them in the two marsupial bones attached to the pubis, but have no ventral pouch. They have only one excernent opening, and, in this respect, they resemble birds. They have no teats, or at least none have been discovered, and it is not known whether they are oviparous or viviparous. They include the *Echidna* or Porcupine Ant-eater, and the *Ornithorynchus* or Duck-billed quadruped, both of New Holland, (Cuvier.)—P.

BOOK XXII.

Continuation of the Theory of Geography. Of the Earth, considered as the abode of Organic Beings.

SECTION III.

OF MAN, PHYSICALLY CONSIDERED.

The physical organization of man, while it subjects him to those laws of generation, growth and dissolution, which extend to all orders of living nature, bears at the same time, in each of its parts, and as a whole, a character so peculiar, so extraordinary, and so sublime, that it is impossible to suppose even the most distant relationship between the brutes, which do nothing but feed and propagate on the surface of the earth, and him who is born to exercise dominion over them. That upright and elevated port, which indicates both dignity and courage; those hands, the trusty instruments of our will, the dexterous performers of the most magnificent, as well as the most useful works; those eyes, uplifted from the dust, whose intelligent glance can survey the immensity of the heavens; those organs, which enable us to express thought by articulate sounds of endless variety; the admirable union of strength and suppleness in all our members; finally, the harmony and perfectibility of all our senses, assign to us the first rank among living beings, and give us both the right to claim and the power to hold the empire of the earth.

Anatomy and physiology have placed these truths beyond the reach of dispute.[a] Those naturalists who have pretended to confound the human species with that of monkeys, notwithstanding the essential difference in the feet, in the organs of speech, and the notes of the voice, appear to recognise no fixed principle whatever in their classification of the species of animals.[b]

Even the apparent disadvantages of our organization powerfully accelerate the improvement and the happiness of human existence. Endowed with the strength of the lion, mailed like the elephant, or clothed with a skin impenetrable to cold and humidity, we should perhaps have remained benumbed in stupid indolence, and ignorant of all the arts of life. The extreme feebleness of the human frame at the moment of its birth, the slowness of its growth, the multiplicity of its wants, all those infirmities, all those ills which nature has appointed as our attendants in the journey of life, serve as so many spurs to quicken our dormant faculties, and as so many bonds by which man is knit together with man. Hence the origin of civil society. From the long lasting helplessness of infancy, arises the endearing relation of parents and children; from this relation springs the permanent nature of the conjugal union. The union of men in families is followed by the formation of tribes and nations. It is by uniting with his fellows, and living together under one common law, that man has, as it were, created man; it is by forming a correct estimate of his weakness, and by inventing instruments to assist it, that he has obtained the mastery and the management of the powers of nature; he has felt his penury, and the stimulus of this uneasy feeling has procured for him his true wealth.

This animal, so distinguished from all others, forms in the scale of being an insulated *order*, which contains no more than one genus and one *species;* for we understand by species, a certain number of organic beings which propagate each other, and which differ only in qualities that are variable and distinct from the characters marking the species. Now, all the nations and tribes of human beings of which we have any knowledge, produce, by sexual intercourse, individuals that are prolific, or capable of producing other human beings in their turn. And, on the other hand, the differences observable in these tribes are confined to qualities which we still see every day varying, according to the nature of the food which is eaten, and from the influence of climate and disease.[c]

The first of these assertions does not require illustration. The numerous classes of *mongrels* and *mulattoes* produced by the union of different human tribes, are sufficiently known. As to the second point, we observe that the differences by which the varieties or tribes of the species are distinguished, relate to the *stature*, or the *physiognomy*, or the *colour* of the skin, or the *nature of the hair*, or, lastly, to the form of the *skull* or *cranium*.

Every person knows that a simple mode of life, abundance of nutritious food, and a salubrious atmosphere, give to all organic beings large and graceful forms. The example of the Laplanders and Hungarians, whose language indicates their common origin, and who differ extremely in stature and physiognomy, sufficiently proves that the beauty of the same race varies with the climate and the qualities of the country.[d] The Germans of Tacitus, those Patagonians of Europe, are no longer found in civilized and cultivated Germany, whilst the Hollander, in the interior of the colony of the Cape, has become almost a giant.[e] How many contrasts do we not meet with in a single nation, and at inconsiderable distances? The female peasants of Westrogothia are uncommonly pretty, and those of Dalecarlia are in general ugly, although both provinces occupy the centre of the real country of the Goths.[f] Violent passions, the

[a] See Cuvier, Leçons d'Anatomie comparée, etc.

[b] Man is the only animal whose natural posture is erect. This is owing to the great size and force of his extensor muscles, acting on a skeleton so arranged as to give them a great purchase. In the apes these muscles are comparatively feeble.—P

[c] Blumenbach, De Varietate nativa generis humani.

[d] It is the opinion of Adelung that the Hungarian language is rather Tatar than Finnish.—P.

[e] Barrow's Travels in Africa. Sparmann, Thunberg, &c.

[f] Arendt, Voyage en Suède, i. 234. &c.

yoke of superstition, dull or cheerful occupations, habits of activity or indolence, stamp a permanent character on the physiognomy of whole nations.

Several differences of physiognomy are, partly at least, the effect of art. Numerous eye-witnesses concur in assuring us, that the Negroes,[a] the inhabitants of Brazil and the Caribbees,[b] the people of Sumatra, and those of the Society Islands,[c] depress and flatten, with great care, the nose of new-born infants, a practice which indeed could not have given rise to such a hereditary configuration, but which contributes to render the exceptions extremely rare.

Variety of colour seems equally to depend upon external circumstances. In the same nation we often observe individuals of extremely different complexions. While the Moorish ladies, shut up in their houses, and scarcely ever exposed to the sun, have complexions of a dazzling whiteness, the women of the lower ranks, even in their youth, acquire a colour approaching to that of soot.[d] The Abyssinian mountaineers are as fair as the Spaniards or the Neapolitans, whilst the inhabitants of the plains are almost black.[e] Among the Creoles, or Europeans born in India, the women are distinguished from their sisters born in Europe, by the sprightliness of their look, and the ebony colour of their locks.[f] The cause of colour exists in the mucous and reticular texture, [*rete mucosum*] which is immediately under the epidermis. If, from the influence of extreme heat, or from some other local cause, there is an excess of carbon in the animal economy, it is thrown out along with the hydrogen, by the action of the blood-vessels of the cutis or true skin ;[g] but having been precipitated by the contact of the atmospheric air, it becomes fixed in the *rete mucosum*. The application of these principles, which we owe to modern chemistry, enables us to explain why the skin of white men blackens in certain maladies, whilst negroes, in the same circumstances, grow white, or rather yellow. Both phenomena indicate a derangement in the secretions. But we will not conceal the only difficulty with which this explanation is attended. If the negroes descend from a race originally white, millions of years must have elapsed before the repeated action of the climate could have rendered their black colour hereditary. But, geological monuments seem to show that the antiquity of the human species falls greatly short of such a period. "Either then," will some philosophers say, "either allow, for the action of the causes which have formed the various races of men, an immense series of ages, or admit that these races, if they have existed only for 5000 or 6000 years, must have sprung from different pairs that were originally stamped with all the characters of their descendants." It is by a course of observations upon the transported negroes of Nova Scotia, and other countries, that our remote posterity shall be enabled to solve this difficulty.

The numerous varieties of hair equally depend upon the secretions of the elementary substances, of which the body is composed. But here the facts appear contradictory. Among the civilized nations of Europe, the hair invariably becomes of a lighter colour, as we advance towards the north. Among the barbarous nations of Africa, Asia, and America, the same colour of hair is found in climates completely different. While the dark-haired Italian, and the Scandinavian with his flaxen locks, although belonging to the same variety of the human species, exhibit the effects of the action of climate, the Laplanders and the Samoiedes have hair as black and as rough as the inhabitants of Mongolia, Thibet, and China, a race with which, for other reasons, we must assign them a common origin. All the negro tribes have woolly hair, even the Jalofs, who have theirs a little longer and less curled.[h]

It does not appear that the hair of the Americans presents any shades of difference compared to those which we observe in European nations. We might attempt to explain this fact, by supposing that the nations of the European race, having separated at an early period, occupied countries extremely diversified in regard to climate, and pursued very different modes of living, whilst the Mongol or negro tribes must have multiplied at first in a single physical region, whence they spread themselves, perfectly formed, into the countries which they now inhabit. But this explanation, not admitting of being applied to the Americans, cannot entirely solve the difficulty. The nature of the hair still remains one of the most specious arguments in favour of the system which supposes a plurality of species of men.

We observe, however, that in the European race, the colour of the hair appears to change with the civilization, or rather with the degeneracy of nations. The fair-haired race, which, in the age of Homer, furnished Greece with kings and heroes, still existed in the days of Tacitus in Belgic Gaul and in Germany; but now it appears to have become extinct in the cities of the north. Is it the fact that spicy food, beverage abounding in alcohol, luxury, and voluptuousness, gradually change the physical constitution of these nations?

The varieties in *the form of the cranium* or skull, seem to be of more importance than all those we have examined; at the same time, since the researches of M. Gall[i] have demonstrated, that the external configuration of the cranium depends upon the form of the brain, we can scarcely consider diversities in a substance which is soft, and susceptible of every form, as presenting a character unequivocally marking a diversity of species.[k]

The form of the cranium appears to us to depend as much as the physiognomy upon the moral character of the individuals. Though it is impossible to assign to every passion, and to every faculty, a separate organ in the brain, it is certain that men of great talents, and of strong passions, have the head more varied with bumps

[a] Report of the Committee for the consideration of the Slave Trade, 1789. fol. p. 1. c. 1.
[b] Lery, Voyage au Brésil, p. m. 98. 365. Delaborde, Relation des Caraïbes, Paris, 1764. p. 129.
[c] Marsden's History of Sumatra, p. 38. Forster, Bemerkungen, &c. p. 433, and 516.
[d] Poiret, Voyage en Barbarie, i. 31.
[e] Bruns, Afrika, ii. 119.
[f] Hawkesworth's Collection of Voyages, iii. p. 374.
[g] "Derme."
[h] Bruns. Afrika, v. 69.
[i] Gall and Spurzheim. Anatomie du cerveau, &c. &c. avec fig Chez. Schoell.
[k] Although the brain is soft, yet it is the most peculiarly vital part of the whole system, and one would think, the most likely to give a peculiar character to the solid parts directly subjected to its influence.—P

and protuberances than the multitude. Another fact is, that in those nations, the individuals of which most nearly resemble each other in character, and which have been least mixed with other tribes, the skulls appear to have been cast in one common national mould. When we see the head of one Hindoo, we see the heads of the whole nation :[a] on the contrary, in Europe, where the characters of individuals vary extremely, we find skulls of every form, even the most remote from what we reckon the regular shape.

Independently of this general cause, to which should be added the effects of food and climate, the form of the head is frequently modified by artificial means. A pressure continually applied for a great number of years, much more frequently imparts to the flat bones of the head a peculiar configuration, which becomes even national at last. This effect may be produced by the manner in which some nations place their children in the cradle, or by manual compression, long and carefully applied. Vesalius relates, that in his time almost all the Germans had the head flattened behind, and enlarged at the sides, because they were always laid on their backs whilst in the cradle.[b] The Belgians, on the contrary, who were accustomed in infancy to sleep on their sides, were remarked for the length of their head. The American savages, from South Carolina to New Mexico, have all of them the skull depressed, because they lay their children in the cradle in such a position that the crown of the head, which is placed upon a bag filled with sand, supports almost the whole weight of the body.[c]

A practice prevalent in ancient as well as modern times, in our climates, and in the most distant countries, is to bring the head of the new born infant to a national form by means of bandages, different sorts of instruments, or even the simple pressure of the hands. This custom obtained formerly, and still continues, among the inhabitants of several parts of Germany ;[d] among the Belgians ;[e] the French ;[f] in several districts of Italy ; among the Islanders of the Grecian Archipelago ;[g] the Turks ; the ancient Sigyni, and the Macrocephali of the Euxine Sea ;[h] it prevails to this day among the inhabitants of Sumatra and Nicobar ;[i] and particularly among the different nations of America, such as the people of Nootka Sound ;[k] the Chactas; the native inhabitants of Georgia ; the Waxsaws of Carolina ; the Caribbees ; the Peruvians ;[l] the Omaguas ;[m] together with the negroes of the Antilles.[n] This practice was forbidden in Spanish America, by the decree of a national council.[o] We are in possession of the most exact descriptions of the means which these savages employ to give the heads of their children, by an uniform pressure, the configuration they desire.[p] This fact being established by so many unexceptionable witnesses, all which remains now is to ascertain whether the forms of the cranium, obtained by these means, become, after a long series of generations, natural and hereditary. Hippocrates, in his treatise on air, waters, and situations, mentions particularly the *Macrocephali*, a nation in the vicinity of the Pontus Euxinus. According to him, no other people had the head shaped like theirs ; and this conformation originally resulted from a particular practice. The Macrocephali regarded a long head as the index and symbol of courage ; in conformity with this opinion, they moulded the heads of their infants at birth, and endeavoured, by various contrivances, to give them length at the expense of breadth. This form at last became natural, and no care was required to produce it.[q]

There are also in the form of the human body, other diversities which appear peculiar to nations, and perhaps to different varieties of the human species. It is alleged that several savage tribes have moveable ears ; but it has been probably under the impulse of a satirical spirit, that some authors have assured us, that the ancient Batavians had ears singularly deformed, and that, among the inhabitants of Biscay, these organs are of an unusual length. The pendent breasts of the negresses are occasioned by the practice of suckling their infants suspended from their backs. The fulness of this part seems to be the effect of a warm and humid climate.

We shall notice elsewhere the deformity of the Boschman women in Southern Africa. Among the tribes of the South Sea, or Great Eastern Ocean, the chiefs owe their swollen legs to their indolence and manner of sitting. Perhaps also the *elephantiasis*, a malady frequent in Africa, Arabia, and Indostan,[r] extends over the Oceanic countries. The crooked legs of the negroes, which had been observed by the ancients,[s] appear equally common among the Mongol nations.[t] This deformity has been attributed, either to their being prematurely accustomed to the saddle, or to the posture in which they are placed, during the period of lactation, fastened to the back of the mother, and clinging to her forcibly with their knees.

There are more important varieties in the shape and proportion of the lower limbs, and which are peculiar to the nation or tribe. The savages of New Holland have legs extremely long and slender.[u] It is not true that this peculiarity occurs among the Hindoos, as we are told by an observer unworthy of credit.[x] But it appears certain that the Mongols and Americans have their legs and thighs too short in proportion to the rest of the body. Some nations have small hands and feet.

[a] Comp. the fine work, "Les Hindous," by M. Solvyns.
[b] Vesalius, quoted by Blumenbach, § 63.
[c] Adair's History of the North American Indians, p. 9.
[d] J. Chr. Gottl. Ackermann, in Baldinger's neues magasin für Aerzte, vol. ii. p. 5, 6.
[e] Spigel. de Hum. Corp. Fabricâ, p. 17.
[f] Andry, Orthopedie, vol. ii. p. 3.
[g] Philites, a physician of Epirus, quoted by Blumenbach. Strabo, l. xi. p. 358. Hipp. de aërib. aq. et loc.
[h] Marsden's History of Sumatra, p. 38.
[i] Nic. Fontana, in the Asiatic Researches, vol. iii. p. 151.
[k] Meares's Voyages, p. 349.
[l] Oviedo, Historia Gener. de las Indias. Torquemada, Monarchia Indiana, vol. iii Ulloa, Relacion del Viage, vol. ii. p. 533.
[m] La Condamine, Mem. de l'Academie des Sciences, 1745, p. 427.
[n] Thibault de Chanvalon, Voyage à la Martinique, p. 39.
[o] Jos. Saenz de Aguire, Collectio Maxima Conciliorum Omnium Hispaniæ et Novi Orbis, vol. vi. p. 204
[p] Journal de Physique, Aug. 1791, p. 32.
[q] It is the opinion of Dr. Pritchard that such artificial or accidental modifications of the individual are not transmitted to his posterity.—P.
[r] Allard, Histoire d'une Maladie Particuliere au Systeme Lymphatique.
[s] Arist. Problem, v. 14, &c.
[t] Pallas, sur les Nations Mongoles, vol. i. p. 98.
[u] Pèron, Voyages aux terres Australes, Atlas, pl. xx.
[x] La Boullaye le Gouz, Voyages et Observ. p. 153. Comp. Solvyns, l. c.

The Hindoo sabres, frequently brought to England, are too small in the hilt to be wielded by most Europeans.[a] We might refer also to the Chinese, the Kamtchadales, the Esquimaux, the Peruvians, the Hottentots, and the inhabitants of New Holland.[b]

Nations differ very much in the degree of strength with which they are endowed. The interesting experiments of Peron and Regnier, have proved that savage, or half civilized nations, yield to the Europeans in all kinds of active force; but we have no doubt that they possess, in a more eminent degree, that *passive force* which resists the inclemency of the seasons.

After summing up all the observations made by travellers, the celebrated Blumenbach reduces all the varieties of the human species to *five principal types or models*, in which a deliberate and minute examination has enabled us to make only a few slight modifications.[c]

The first variety occupies the central parts of the old continent, namely, Western Asia, Eastern and Northern Africa, Hindostan, and Europe. Its characters are, the colour of the skin more or less white or brown; the cheeks tinged with red; long hair, either brown or fair; the head almost spherical, the face oval and narrow; the features moderately marked; the forehead smooth; the nose slightly arched; the mouth small; the front teeth perpendicularly placed in the two jaws; the lips, particularly the lower one, slightly pouting; the chin full and round. The regularity of the features of such a countenance, which is that of the European, causes it to be generally considered as the most handsome and agreeable. The features of the Hindoo, the Abyssinian, and the Breber, or inhabitant of Mount Atlas, do not essentially differ from those of the European, except in the colour of the skin, which is darkened from the effects of climate, and which, moreover, among the Hindoos, and even the Abyssinians, acquires a very fair tint in the mountainous provinces. Blumenbach designates this race the *Caucasian;* but by bestowing this name he invades the province of civil history, which assigns us no reason for believing the people of Caucasus to be more ancient than those of Mount Atlas or the Alps. Neither physiology, nor physical geography, furnish the least proof, that this variety of the human species has had a common origin; it has formed itself wherever there existed the physical causes on which it depends.

The second variety is that which was at first erroneously designated under the appellation of *Tartar*, though the Tartars, properly so called, do not belong to it. We shall call it, the *Eastern Race*, or *Variety of the Ancient Continent.* The following is its character; yellow colour; hair black, stiff, straight, and not very thick; the head almost quadrangular; the face broad, flat, and depressed; the features indistinctly marked, and, as it were, blended together; the space between the eyebrows large and smooth; the nose small and flat; the cheeks round and prominent; the opening of the eyelids narrow and linear; the chin pointed.

This variety comprises all the Asiatics to the east of the Ganges, and the Belur mountains, except the Malays at the extremity of the peninsula beyond the Ganges. In Europe this variety is found, according to Blumenbach, among the Laplanders and the Finns; and in America, among the Esquimaux, from Behring's Straits to Greenland. But we are convinced that the Finlanders, descendants of the ancient Scythians of Europe, should be classed with the first variety, of which they form a very ancient subdivision, allied with the Celts and the Basques, as will be shown in the description of Europe.

The Eastern race of the old continent, bounded by the limits that we have just now traced, presents a remarkable identity of tint, physiognomy, form of the skull, and even of language, as we shall see in the sequel.

The American variety resembles, in several points, that which we have been describing. Its principal characters are, the copper colour; hair black, straight, stiff, and thin; forehead short; eyes sunken; the nose almost flattened, and yet somewhat projecting; the cheek bones in general prominent; the face broad, without being flat or depressed. The features, viewed in profile, appear very marked, and of a bold outline. The form of the forehead, and the crown, is often the effect of art.

This variety comprehends all America, except the northern extremities, inhabited by the Esquimaux. It appears to be composed of several branches, which differ considerably, either in the complexion, which is white or fair among the Kristinaux, and almost black among the Brazilians; or in the features and in the skull, which is sometimes flattened, and sometimes lengthened. All these tribes have a beard,[d] but it is weak; there are some who, like the Mongol and Malay nations, pluck it out by the root. The opinion that the American tribes were destitute of beards, owes its origin to De Paw Robertson the historian, an author still more worthy of credit, has said, that all the Americans have the same cast of countenance: to such a degree have the truths of physical geography been overlooked or disregarded by those who have undertaken to write the history of man.

We shall now return to the East, in order to consider the fourth variety of the human species, that of the Oceanic countries, or fifth part of the world, designated by Blumenbach under the too arbitrary name of the *Malay race.* The following are its still very uncertain characters,—a tawny colour; the hair black, soft, thick, abundant, and curled; the head slightly shrunk in; the forehead a little bulging out; the nose thick, wide, and flattened; the mouth large; the upper jaw a little projecting; the features viewed in profile, appear marked and distinct.

This variety comprehends the islanders of the Pacific Ocean, the inhabitants of the Marian, Philippine, Molucca, and Sunda Islands, and the indigenous tribes of the peninsula of Malacca, most of the inhabitants of New Holland, and those of New Zealand, and perhaps even

[a] Hodge's Travels in India, p. 3.

[b] De la Barbinais, Voyage autour du Monde, vol. ii. p. 62. Dampier's Continuation of Voyage round the World, p. 100. Wales, Philosoph. Transact. vcl. lx. p. 109; and Curtis, ibid. vol. lxiv. p. 383. Watkin Tench's Account of the Settlement of Port Jackson, p. 179.

[c] Although Blumenbach arranged the human species under five varieties, yet he classed their skulls under three grand types or divisions, according to their appearance when viewed from above (*norma verticalis.*) These were, the *oval* or European; the *square* or compressed from before backwards, (the Mongol, Malay, and American;) and the laterally compressed or the Negro.—P.

[d] Blumenbach, Gottingen Magazine, &c. &c

some of the nations of Madagascar. But how difficult is it to determine any thing concerning nations so imperfectly known, and which appear to include tribes of different origins! The immortal Quiros, who first discovered the Society Islands, carefully observed the disparity which exists between their inhabitants. He says that some resemble the Whites, others the Mulattoes, and even the Negroes.[a] Modern voyagers have compared the reigning cast in the island of Otaheite, to the Europeans of the south, and the people to the Mulattoes.[b] The very great extent to which the Malay language prevails, and which at first leads us to suppose the identity of these nations, could be the consequence only of ancient migrations and conquests. At the same time, it is proper to state, that the savages of New South Wales, who speak a language different from the Malay, exhibit, notwithstanding, the leading physical characters of the last mentioned variety.

The fifth grand division of the human race, or the *Negro variety*, is attended by no circumstances of a doubtful nature. The characters are, colour black; hair black and woolly; head narrow, and compressed on each side; forehead very convex, and arched; the cheek bones projecting forwards; the eyes even with the forehead; the nose large, and almost confounded with the upper jaw, which is carried forward; the border of the gums narrow and elongated; the upper front teeth, or incisors, obliquely placed; the lips, particularly the upper, very thick; the chin drawn back; the legs in general crooked. This variety, which is spread over all Western and Southern Africa, is found also upon the coasts of Madagascar, (probably upon those of the north-west,) and of New Holland, and in the great islands of Van Diemen's Land, New Caledonia, and New Guinea. It is even supposed that it anciently occupied the Philippine islands, Borneo, Java, and Sumatra. The *Haraforas*, who still inhabit the interior of some of these islands, are Negroes; so also are the natives of the islands of Andaman. Thus all the regions of the torrid zone, with the exception of America, have produced Negro tribes;—a manifest proof of the influence of climate upon the varieties of the species. But when we observe the differences between a real Negro, with a complexion of jet, and woolly and crisped hair; a Caffre, with a yellow copper complexion, and long woolly hair; a native of Van Diemen's Land, a New Caledonian, or a Papous or New Guinea man, of the colour of soot, with frizzled locks,—we remain uncertain whether these three races, separated besides by seas and mountains, are each of them the original inhabitants of their present abode, or whether they have all descended from a common stock.

The Hottentots form another remarkable exception: the shape of their skull is that of the Malay race; they have the complexion and the thin beards of the Mongol variety, but their woolly hair resembles that of the Negroes.

Such are the principal varieties of the human species, spread over the surface of the globe. The ancients erroneously imagined that the torrid zone, scorched by the rays of a vertical sun, cut off all communication between the inhabitants of the two temperate zones. This opinion, which contracted the boundaries of the universe, has vanished away before the discoveries of Columbus, of Gama, and of Cook. Navigators have found inhabitants in the most sultry climates, and in the neighbourhood of the poles, upon the most inaccessible coasts, and even on islands that a boundless ocean seemed to separate from the rest of the world. The islands of Spitzbergen and of Nova Zembla, to the north; Sandwich Land, the Falkland islands, and Kerguelen's Land, to the south,—are the only countries of considerable extent, which have been found entirely destitute of human inhabitants. Man, therefore, has the whole earth for his abode. He can live in every climate, and his habitations reach to the remotest confines of animated nature. The Esquimaux of Greenland dwell as far north as the 80th degree. In the other hemisphere, the bleak and barren Terra del Fuego supports the wretched Petcheres. The New World, then, though in general thinly peopled, is still inhabited from one extremity to the other. In the old continent, the habitations of man form a collected whole, which is broken in upon only by some sandy tracts; and in the midst even of these deserts, man has peopled the *Oases*, those verdant islands scattered over an ocean of sand.

The human body supports, upon the banks of the Senegal, a degree of heat which causes spirits of wine to boil.[c] In the north-east of Asia, it resists cold which freezes mercury. The experiments of Fordyce, Boerhaave, and Tillet, prove that man is more capable than most animals of supporting a very great degree of heat.[d] We have no doubt that our body would resist extreme cold equally well, provided that it retained the power of moving. As the intensity of the cold should scarcely increase beyond the 78th or 80th degree, it is probable that man could sail under the poles as well as under the equator, if he were not arrested by the ice.

The power which man possesses of speedily accommodating himself to every climate, appears to spring from the same cause which renders his health less sound and less steady than that of other animals. It is to the superior affinity of the component particles of their bodies to inert matter, that animals are indebted for those instincts of which we are destitute. Our senses, on the contrary, are not so poignant, our body is not so susceptible of impression, the impulse of our passions is not so ungovernable, because the whole of our organization is more subtile, more delicate, and, if we may say so, more intellectual. The instability of health, and the uncertain duration of life, are the natural consequences of this delicate mobility of our organs. It is owing, however, to this same mobility, that our organs obey with ease and promptitude the volitions of the soul. A firm determination not to be overcome by a distemper, but to bear up against it, is, in the opinion of physicians,

[a] Quiros, in Dalrymple's Collection of Voyages to the Southern Pacific Ocean, vol. i. p. 161.

[b] Bougainville, Voyage autour du Monde, p. 211.

[c] Alcohol boils at 173° Fahr.—P.

[d] By these experiments they proved that they could remain in a room heated above the boiling point (212°) for an indefinite time. By some experiments of M. De la Roche, it is shown that a free communication with the external air is necessary. The excess of heat is carried off by increased transpiration.—P.

one of the most potent medicines, whilst an apprehensive and desponding imagination, is sure to aggravate the slightest indisposition. And thus it is that our bodily frame, in order to be fortified against the influence of a new climate, only waits for the orders of the mind, to which it serves as an organ. Under every climate, the nerves, the muscles, and the vessels, by stretching or relaxing, by dilating or contracting, soon acquire the state which is habitually suited to the degree of heat or cold that the body experiences.

It is commonly said, that the sum total of men living upon the earth may amount to a *milliard*, or one thousand millions. But all the calculations which have been made upon this subject are chimerical. It is impossible to state any which shall even approximate to truth. Asia, it has been said, contains five hundred millions of inhabitants; but it has been only by proceeding upon the most exaggerated data for each of the countries which compose this quarter of the world, that this sum total has been arrived at. The truth is, we have no greater reason for giving to Asia 500 millions than for giving it 250. Among the different accounts respecting China, how shall we hit upon the true one? Has that country 27 millions of inhabitants, according to Sonnerat? or 55 millions, according to the extract from the official Gazette of Pekin? or 70 millions, according to the Russians? or 100 millions, as De Guignes believed? or 19,662,000, as Busching informs us? or 200 millions, agreeably to the statement of the Missionaries? or, finally, 333 millions, as a Chinese mandarin, perfectly veracious no doubt, assured Lord Macartney?[a] This single example may suffice to convince the judicious reader, that all this parade of figures, is founded only upon vague conjectures. We have endeavoured to compute the population of Asia, by collating the accounts of modern travellers. We affirm nothing: we merely say that it appears to us that we cannot assign to Asia more than from 320 to 340 millions of inhabitants.

The *Oceanic* division of the earth, or that collection of large and small islands to the south-east of Asia, contains vast spaces almost entirely unknown. Carrying partial computations as far as possible, we shall find, from Sumatra to Easter Island, and from Manilla to New Zealand, only about 20 millions of inhabitants.

As to Africa, the uncertainty is so great, that, upon the whole, we do not know whether we should estimate that quarter of the globe at a population of 45, or 90 millions. One third of Africa is so completely unknown, that it is not ascertained whether it contains lakes, or mountains, or sandy deserts. Of the parts which are best known, there is not one concerning which we possess any correct calculations. All that we know is, that the population of Egypt, of the Barbary States, and of the empire of Morocco, has been prodigiously exaggerated. Mention is made of very populous countries on the banks of the Niger; but what traveller deserving of belief has seen those great cities which should have more inhabitants than London? All pretensions to certain calculation would be ridiculous; but, if we take a mean term, 70 millions may be considered as the *maximum* of the population of Africa.

150 Millions of inhabitants have been assigned to America. But there is scarcely *one-third* of this number whose existence can be proved. The Spaniards have scarcely extended their calculations beyond 20 millions of inhabitants of all classes, for the whole population of their colonies; and even this is perhaps a third too much. Brazil has only one million of inhabitants, according to Raynal; but we should now reckon a a little more than four millions, including the natives. It would be difficult to discover more than two millions in all the great and little Antilles, deducting those possessed by the Spaniards. The United States have (1821) from ten to eleven millions of inhabitants. English Canada, and Nova Scotia, with their dependencies, can be estimated only at a million and a half. We shall not meet with two millions of individuals in the savage tribes, or rather families of the interior and north-west. It is evident, therefore, that the whole of America does not contain more than 45 or 46 millions of inhabitants.

Let us sum up the whole of these hypothetical results. Europe, the only quarter which is known, may contain 170 millions of inhabitants. Asia has from 320 to 340 millions. All the islands of the Great Ocean, forming the fifth part of the world, may contain 20 millions; we shall leave 70 millions to Africa, and 45 millions to America. The sum total of the human race then, will amount only to 640 or 650 millions of individuals, instead of a *milliard, or* 1000 millions.

We have more satisfactory and correct results as to the proportions which subsist between the births and deaths, and the number of marriages and of living individuals of each sex and of every age.[b]

The natural limit of human life seems to be from 80 to 90 years. Few men survive that period—the greater majority die long before they even approach it. Of all new born infants, one out of *four* dies the first year. *Two fifths* only attain their sixth year; and, before the twenty-second year, one *half* of the generation is consigned to the grave. The order which death observes in cutting off his victims is one of the most wonderful phenomena in nature—the causes by which it is affected are too numerous and too complicated to be here considered in detail. The unhealthy nature of certain occupations, the impetuosity of the passions, and the cor-

[a] Population of China within the wall (1818) 148 millions. (Marucci.)—P.

[b] Sussmilch, Divine Order in the variations of the human race, in regard to births, &c. &c. 2 vols. 8vo. (in German,) 3d edition, Berlin, 1765. (4th edition, posthumous, with a supplement by Baumann, 1775-87.) Euler, Recherches Gènerales sur la mortalité et multiplication du genre humain, in the Memoirs of the Academy of Berlin, 1760. Lambert, Remarks upon mortality, births, &c. in his Essays on applied Mathematics, Berlin, 1772, (in German.) 9th Essay. Desparcieux, Essai sur les probabilités de la durée de la vie humaine. &c. &c. Paris, 1746. Wargentin, various Memoirs on tables of mortality, &c. in the Memoirs of the Academy of Stockholm, vol. xvi. xvii. xxviii. et xxxi. Halley's Estimate of the degrees of mortality of mankind, &c. in the Philosophical Transactions, 1691. Arthur Young's Political Arithmetic, 1775. Black's Arithmetical and Medical Analysis of mortality, &c. London, 1789, 2d edition. Short's New Observations on City, Town, and Country Bills of Mortality, London, 1750. Kerseboom, Verhandeling tot en Proeve, &c. that is to say, Memoir upon the manner of ascertaining population, 1738, Id. Aanmerkingen op de Gissengen, &c. that is, Remarks on the conjectures relative to the number of men, 1742. Petty's Observ. on the Dublin Bill of Mortality, &c. 1683. Ejusd. Several Essays on Political Arithmetic, 1699. Grant's Annotations made upon the Bills of Mortality, 1666 &c. (these works are quoted in the order of their importance.)

ruption of manners, prove no less fatal to life than the original weakness of the human frame. In general, the *mean duration* of human life is between 30 and 40 years; that is, out of 30 or 40 individuals, one dies every year.

This proportion varies in a singular manner, according to sex, localities, and climates, and even from one province to another. In 1774, there was, according to Sussmilch, one death for every 26 men and women in Prussian Silesia, and 1 for every 36 in the March of Brandenburg. In Sweden, according to Wargentin, they reckon 1 in 33 for the men, and 1 in 35 for the women. In Denmark, the proportion is, according to the statistics of Thaarup, 1 in 37 $\frac{3}{11}$, including Holstein. In Norway, according to the same author, they allow 1 in 48 $\frac{4}{9}$. The German-Russian geographers affect to establish a proportion still more favourable for Russia, viz. 1 in 58 or 59; but there is reason to believe that they proceed on erroneous data. It is certain that in small districts, the proportion which the number of deaths bears to that of the living inhabitants is sometimes extremely low. In the parish of *Woerdal*, in Norway, the mortality was only 1 in 74, during ten years. In the government of *Woronetz* in Russia, the mortality was that of 1 in 79 $\frac{9}{11}$; but it is physically impossible that proportions so favourable can obtain in a country of large extent. In France, it appears that the proportion is 1 death in 35; and that is perhaps the most unexceptionable basis that can be adopted for any country of the same extent.

It is said that the mortality is much greater in towns than in the country. Wargentin calculates that in Stockholm 1 in 17 men dies, and 1 woman in 21. According to Price, there dies in the large towns of England, every year, 1 out of from 19 to 23; in the small towns, 1 in 28, and in the country, only 1 in 40 or 50.

Aristotle long ago exhorted governments to prevent the accumulation of inhabitants in cities.[a] Sussmilch compares cities to a continually raging pestilence. Such a sweeping assertion exaggerates the effects of an evil whose existence cannot be denied. The inhabitants of the country enjoy two great advantages over those of towns, a purer air, and a more sober and regular life. On the other hand, rural employments expose those who follow them to so many accidents, and subject them to so many hardships, and to such a miserable mode of living, that it may be doubted whether the real disadvantages in cities are as great as has been supposed. The apparent disproportion is probably owing, in a great measure, to the circumstance of the hospitals being almost always established in towns, and many of the sick being brought to them from the country. Out of from 20 to 21,000 deaths in Paris, it is generally found that from 6 to 7000 have taken place in the hospitals alone.

It appears that the air of open and elevated plains, and of mountains having a free approach, is conducive to longevity. The same thing may be said of an insular atmosphere, which is always renovated by the breezes from the sea. Russia, Norway, Sweden, Denmark, Scotland, Ireland, and Switzerland, are the countries which furnish the most numerous and the most authentic examples of men and women having had their lives extended beyond the period of 100 years. In these countries, we may reckon one centenarian for every three or four thousand individuals.[b] But, we know that there are many countries in which longevity is common, although we do not exactly know to what extent. Pliny mentions that part of Italy which extends from the Appennines to the Po, and from Placentia to Bologna, as containing a great number of men, from 100 to 150 years of age, at the time of the census which was taken under the emperors Claudius and Vespasian.[c]

Rare examples, however, of extreme longevity, of a life of 150 years and upwards, seem to be common to all countries without distinction. If England, the salubrity of which is so highly extolled, has furnished three or four examples of men arriving at the age of from 150 to 169 years,[d] Hungary which, generally speaking, is not a very healthy country, has seen the celebrated Peter Czartan prolong his life to the 185th year,[e] and John Rovin, at the age of 172 had a wife of 164, and a younger son of 117. It is in the Bannat of Temeswar, a very marshy district, and subject to the putrid fever, that these examples of longevity, and many others, have been observed.[f] A mode of life, which is sober, and unruffled by tumultuous passions, singularly contributes to longevity. According to the author of a very curious little work,[g] called the *Apology for Fasting*, 152 hermits, taken in all ages, and under every climate, produce a sum total of 11,589 years of life, and consequently an average of 76 years and a little more than three months for each; whereas the same number of Academicians, the one half belonging to the Academy of Sciences, and the other to that of Belles Lettres, give only 10,511 years of life, consequently 69 years and a little more than two months for the mortal career of each. It is therefore not improbable, that in the ages of patriarchal innocence, the period of 150, or even 200 years, was much more commonly attained than it is in our times. This is what the ancients affirm of the *Seres*, of the *Cyrni* of India, of the *Epians* in Ætolia, and of the inhabitants of Mount Athos and Tmolus.

In the ordinary course of nature, at least among civilized nations, the number of births exceeds the number of deaths. But the proportion varies with the situation. In the country, there is frequently 1 born yearly for every 22 of the population. In towns, the proportion is less favourable, being often 1 to 40, more generally 1 to 35. In this respect, climate occasions a remarkable difference. The most healthy climate is not always that in which there are most children born—for example in Denmark, the proportion of births to the existing inhabitants is as 1 to 31; in Norway, as 1 to 34. In France, the proportion is as 1 to 29. There are reckoned in Sweden 4 children to a marriage—in France 4½; consequently the ancient opinion, which considered the north as the *officina gentium*, the cradle of nations,

[a] Arist, de Republ. vii.
[b] Sussmilch, Ordre divin, &c § 483
[c] Plin. vii. 49.
[d] Robinson, Philosophical Transactions, Nos. 44 and 221. Baddam's Memoir, i. 164. iii. 174. Harleian Miscellanies, vi. art 8
[e] Comment. de rebus in scient. natur. et medic. gestis, vol. v. p. 147
[f] Hanov, Raretés Naturelles, i. 120. (in German) Cramer, Append. ad Medicin. castrens. de climate Hungarico.
[g] Journal de Médicine, vol. lxxiii. p. 340

although supported by many philosophers[a] besides the antiquary Rudbeck, is altogether destitute of foundation.

The manner of life, the nature of the different trades, and the quality of the food commonly used, are circumstances which exert a greater influence than climate upon the propagation of the human race. It has been observed, that people who live upon fish, multiply faster than those who subsist on nothing but flesh.[b] The fecundity of the women of Sologne, a country by no means healthful, is perhaps to be ascribed to the buckwheat which constitutes the principal article of food to the inhabitants of that canton; for this kind of grain, as is observed in birds, appears to stimulate the organs of generation,[c] whilst rye,[d] on the contrary, is said to occasion infecundity in the fowls that feed upon it.[e] Among tribes that lead a wandering life, and are not very numerous, there are fewer children born than in those better peopled countries where the individuals of both sexes are brought nearer together, and are more frequently in presence of each other. In populous countries, however, which have attained a high degree of civilization, the number of births diminishes, owing to the dearness of provisions, which makes it more difficult to support a family, and consequently renders marriages less frequent. The period in which a people subsist principally by agriculture, and when the conveniences of life are easily procured, appears to be that in which population most rapidly advances.[f]

It is owing to the physical influence of the air, the food, and the mode of life, that certain seasons of the year are more favourable to fecundity than others. Pliny calls the spring the *genial season*. Hippocrates had previously observed, that spring was the season most favourable for conception. Aristotle has justly remarked, that the sun and man labour together in the reproduction of man. Observations made in several countries, concur in determining the months of December and January, to be those in which the greatest number of children are born. Local circumstances, depending upon the manner of life peculiar to a nation, may modify or alter this general rule. In Sweden, according to Wargentin, the month in which there are most births is that of September, and the month of January only ranks next to it. This fact is easily explained, when we recollect that among all the nations of the north, particularly in the country, the season of Christmas and the new year is devoted to festivity and mirth.

The number of births is directly and materially affected by causes of a moral and political nature. The difficulty of finding subsistence is unfriendly to the increase of marriages, and it is only from marriages that a state can hope to see a numerous race of children arise. Libertinism, a community of wives, polygamy, and divorce, have never had a salutary influence on population. It has been shown by the most authentic calculations, that of two bodies of individuals, equal in number, that which lives in the marriage state produces more children than that which promiscuously indulges in the commerce of the sexes. As to the celebrated institution proposed by Plato, we must refer to that philosopher himself. The community of wives that he thought of, was regulated by severe laws, and had for its object to *limit* population, by purifying it.[g] The polygamy of the East, considering the numerical equality of the two sexes, allows a plurality of wives to one man, only by condemning to celibacy a great proportion of the community. Montesquieu accordingly, has declared it to be very injurious to population;[h] but this philosopher has at the same time defended the facility and frequency of divorce. He has ventured to attribute to this cause the immense number of inhabitants which he assigns to the ancient Roman empire; and he has gone so far as to insinuate that the Christian religion, by inculcating continence, and the indissoluble nature of the marriage union, has diminished the number of the human race.[i] This calumny is easily refuted by the testimonies of the ancients themselves, who all agree in representing the primitive sanctity of marriage as the direct source of the inexhaustible strength of the Roman republic,[k] whilst under the emperors, in the age of corruption, Italy would have remained uncultivated for want of hands, had the soil not been laboured by legions, or rather by whole nations of slaves, collected together from all parts of the world.[l] All the evil which has actually arisen from the celibacy of the clergy—a celibacy no where enjoined in the Gospel—cannot countervail the services which Christianity has rendered, merely with regard to the increase and preservation of our species.

The immoderate use of strong liquors tends to enervate the frame, and to exhaust the powers of propagation. An active, sober people, equally moderate in their passions and their pleasures, will always be superior in fecundity to a people debauched by luxury, effeminacy, and voluptuous enjoyments. A proof of this may be obtained by comparing an agricultural country with one which is filled with vineyards. It appears to be proved that a square league laid out in fields, can furnish occupation and food only for 1390 individuals, whereas a space of equal extent, planted with vineyards, supports 2604 persons.[m] Why then are districts abounding in vines, often more thinly peopled than agricultural provinces under the same climate? Why are the vine-dressers so often in miserable circumstances? For no other reason than that drunkenness is more prevalent in such a district, and because the annual produce of the vine is more uncertain than crops of grain.[n]

[a] Machiavelli, Storia Fiorent. 1. c. 3. Bayle, Nouvelles de la République des Lettres, 1685. January, art. 8. Comp. for refutation, Wargentin, Mem. of the Academy of Stockholm, xvi. 173. (German translation.)

[b] Montesquieu, Esprit des Loix, l. xxiii. c. 13.

[c] Mem. de la Société Royale de Medicine, 1776, part ii. p. 70.

[d] "Seigle ergoté," ergot or spurred rye.—P.

[e] Journal de Medicine. vol. lxiv. p. 270.

[f] The United States have been in this situation, since the establishment of their government; and the period of doubling their population has been about 20 years.—P.

[g] Plat. de Republ. lib. v

[h] Lettres Persanes, Let. 110. Esprit des Lois, liv. xvi. chap. 6.; liv. xxiii. chap. 2.

[i] Montesquieu, Lettres Persanes, Let. 110, 112. Comp. Esprit des Lois. xvi. 15.; xxiii. 21. near the end.

[k] Dionys. Halicarn. ii. Valer. Maxim. ii. c. 4. Aul. Gell. iv. c. 3 Plut. Parall. Thes. et Romul. Cic. de Republ. lib. vi. "Majores nostri *firmiter stabilita* matrimonia esse voluerunt."

[l] Plin. Hist. Nat. xxxiii. 10. Seneca de Tranquill. c. 8.; De Brevit Vitæ, c. 12. Athen. Deipnosoph. vi. Lips. de Magnitudine Romana, ii. 15.

[m] Discours sur les Vignes, Dijon, 1756.

[n] The people of the vine countries of S. Europe are generally con

"The period of puberty arrives sooner," it has been said, "in warm and southern countries, than in cold climates, as those of the north, and of elevated mountains." This commonly received opinion must be understood with some limitation. It is true, for example, that the Barbary women are generally mothers at 11 years of age, and cease to bear children at 30.[a] Buffon, quoting from Thevenot, says, that in the kingdom of the Deccan, boys are married when 10 years old, and girls when eight, and that there are some who bear children at that age; so that they may be grandmothers before they are 20. But if this were purely the effect of climate, as Buffon imagines, a very singular consequence would follow. The climate which the Negroes of Senegal inhabit, is certainly warmer than that of Barbary, and even than that of the peninsula of the Deccan. If then it is the influence of climate alone which accelerates the period of puberty among the nations of India, and which fixes it at 10 or 11 years of age, the same influence should also fix the period of puberty among the Negroes at seven or eight years. But so far is this from being the fact, that all the accounts which we have consulted, seem to prove that the age of puberty among the Negroes is not much earlier than among the southern nations of Europe. It appears, then, that even in the torrid zone, the physical phenomenon in question, depends rather upon the *difference of the race*, than upon that of the climate.

There are other facts still more conclusive. All the Russian and Danish travellers who have given us written accounts of Lapland, and the other countries in the neighbourhood of the Frozen Sea,[b] agree in stating that the women of these regions are not only very lascivious, but that they become marriageable at an early period. A Frenchman who has seen much, and seen with observation,[c] assures us that the Swedes become sensible to the passion for the sex at the age of 12 years. In Russia the peasants often marry at the same age. In the Vivarais, a mountainous and cold tract of country, the natives are as soon marriageable as in the other provinces of the south of France.[d] The savages of America, who dwell under the line, arrive as late at puberty as those who live near the pole. With them the men do not marry before they are 30, nor the women before 20.

It appears then that we should consider this physical difference rather as inherent in the particular race than as dependent on climate. The cause is often to be found in the extreme corruption of manners. Be this as it may, the phenomenon of which we speak has probably but little influence on the number of births, and none whatever upon the increase of population. In the first place, it is observed, that in every country where women are marriageable at a very early period, they also sooner cease to bear children: in India they become old at 30. In the second place, the children in those countries are more feeble, and subject to greater mortality.

This last observation can even be extended indiscriminately to all nations; we should always beware of inferring an increase of population, *solely* from the number of the births appearing to be greatly superior to the number of the deaths. When this *excess* is extremely disproportionate to the number of deaths and marriages, there is reason to suspect some want of exactness in making out the lists, or some extraordinary physical circumstance. *The proportion of births to marriages*, on an average, and in a country of some extent, can scarcely be more than 5, or less than 3 births to one marriage. The ordinary proportion, in the most civilized countries of the world, is four births to one marriage. *The proportion* between *births and deaths* is, one year with another, from 101 to 150 for every 100. This last proportion indeed occurs only in some provinces of small extent, and singularly favoured by nature. Every proportion higher than this, with regard to an extensive country, ought to be viewed with suspicion, unless verified by calculations and registers of undoubted correctness and authenticity. To mention only one example: the Russians may be permitted to assert that almost every year, (even in time of war,) there are more than one million of individuals born in the Russian empire, whilst only from 500,000 to 600,000 die. But we also must be allowed to express our doubts as to these marvellous results, and to ascribe, in part, this disproportion between the deaths and the births, to the carelessness of those who keep the registers.

Euler has constructed the following table, by means of which we may see, at a glance, in how many years the population of a country may be doubled under certain conditions.[e]

In a Country of 100,000 *inhabitants, the Mortality being* 1 *in* 36.

The deaths being to the births, as,	The surplus of births will be	This surplus will make of the sum of the living	The doubling of the population will take place in
10 to 11	277	$\frac{1}{361}$	$250\frac{1}{12}$ years.
—— 12	555	$\frac{1}{180}$	125
—— 13	722	$\frac{1}{138}$	96
—— 14	1100	$\frac{1}{100}$	$62\frac{3}{4}$
—— 15	1388	$\frac{1}{72}$	$50\frac{1}{4}$
—— 16	1666	$\frac{1}{60}$	42
—— 17	1943	$\frac{1}{51}$	$35\frac{3}{4}$
—— 18	2221	$\frac{1}{45}$	$31\frac{2}{3}$
—— 19	2499	$\frac{1}{40}$	28
—— 20	2777	$\frac{1}{36}$	$25\frac{3}{10}$
—— 22	3332	$\frac{1}{30}$	$21\frac{1}{8}$
—— 25	4165	$\frac{1}{24}$	17
—— 30	5554	$\frac{1}{18}$	$12\frac{4}{5}$

sidered as less given to inebriation than the people of the N. of Europe. However, in those northern countries they supply themselves abundantly with alcohol from their grain, by distillation and fermentation. From many facts, one would be inclined to think inebriation with alcohol more particularly the vice of the colder climates, and that with opium of the warmer climates.—P.

[a] Shaw's Travels in Barbary, 4to, p. 241.

[b] Hægstrom, Klingstedt, &c. &c.

[c] M. Fortia de Piles, dans le Voyage de deux Français dans le Nord, tome ii. p. 422.

[d] Mémoire de la Société royale de Médicine, 1780 et 1781, part II. p. 130.

[e] Euler, Tables communicated to Sussmilch, Ordre divin, chap. viii. §§ 152, 156, 162.

The same mathematician, founding on data extremely favourable to the propagation of the species, has constructed a table, the general result of which is, that the human race might be tripled in 24 years, and that at the end of 300 years the posterity of one couple might amount to 3,993,954 individuals.

Taking the total number of the human race at 700 millions, (which is rather high,) the ratio of the deaths to the living population as 1 to 33, and that of the births to the living as 1 to 29½, we shall have for the whole globe,

	Births.	Deaths.
In one year,	23,728,813	21,212,121
— one day,	65,010	58,120
— one hour,	2,708	2,421
— one minute,	45	40
— one second,	¾	⅔

Whence it follows, that the sum total of the human race would, in one year, be augmented by an accession of 2,516,692 individuals, were it not for wars and pestilences. This augmentation would, in 100 years, bring the number of men up to 3216 millions. The earth might, perhaps, support a still greater number; but all the records of history seem to concur in showing that the increase of the human race has hitherto advanced at a much slower rate.

The *proportion between the numbers of the two sexes* is a matter of great importance, both in statistics and legislation. In Europe there are always more boys born than girls, in the proportion of 21 to 20, or, according to others, of 26 to 25. On the other hand, the mortality also is greater among the male children, in the proportion of nearly 27 to 26; in consequence of which, about the 15th year, the numbers of the two sexes are brought almost to an equality: there is, however, still a surplus in favour of the males. But this surplus in the number of the men, even though it were three or four times greater, is carried off by wars, by dangerous voyages, and by emigration, to the casualties of which the female sex are less exposed. Thus, the final result of this is, that in our climates the women are always more numerous than the men. This difference is particularly observable at the conclusion of a long war. According to Wargentin, it amounted in France, after the seven years war, to 890,000 in 24 or 25 millions of souls; and in Sweden, after the Northern war, about 127,000 in a population of two million and a half.

At the same time the difference of numbers between the two sexes is not in Europe sufficiently great, nor indeed sufficiently steady to warrant any conclusion unfavourable to the system of monogamy, that is, of marriages between one man and one woman. Such marriages only are fitted to insure domestic happiness, and to maintain pure morals; they are besides sanctioned by the soundest maxims of political economy; and none can doubt that the prevalence of *polygamy*, or the marriage of one man to several wives, would prove fatal to the welfare of Europe.

Some travellers[a] have imagined that in warm climates there are more girls born than boys; and as the male sex is liable to more rapid destruction in such climates than in ours, the surplus of women must become very great; hence Montesquieu concludes that polygamy among those people admits of a very plausible excuse; but the position from which he sets out is altogether unfounded. The researches of Father Parennin in China,[b] the lists of baptisms kept by the Danish missionaries of Tranquebar,[c] the various censuses taken by the Dutch at Amboyna and Batavia,[d] and the observations made at Bagdad and Bombay, by the judicious Niebuhr,[e] have demonstrated that the number of children of both sexes is not more disproportionate in the East than in Europe.

It is alleged with more reason, that there are some nations who, being in the habit of selling a number of their women to foreigners, experience a deficiency of them at home, which has obliged them to establish *polyandrism*, or the marriage of one woman to several husbands.[f] Such a practice, if it does exist, is evidently the least favourable to population.

It has been commonly computed that a district, in which there are 10,000 infants born yearly, must contain in all, 295,022 inhabitants of both sexes, of whom 93,003 should be children below 15 years, and 202,019 persons above that age.

Among these individuals, there will be at the most 23,250 monogamic marriages, (the mean duration of which may be estimated at 21 years,) 5812 widows, and 4359 widowers, the rest single.

[a] Kæmpfer, Description du Japon, i. liv. 2, chap. 5. A Collection of the Voyages of the East India Company, i. 346.
[b] Lettres édifiantes, xxvi. recueil, p. 8. (Paris, 1743.)
[c] Sussmilch, l'Ordre Divin, &c. § 418.
[d] Valentyn, Beschryving van Amboina, ii. p. 342. Struyck, Nader ontdekkingen noppens den staat van het menschelyk geslagt, p. 104. (in Dutch.)
[e] Niebuhr, Description de l'Arabie, i. 102, *sqq.*
[f] Duhalde, Description of China, iv. 461. Strabo (Description of Media,) ix. 798. edit. Almel. Compare Michaelis, Mosaic Law, ii. 199 (in German.)

BOOK XXIII.

Continuation and Conclusion of the general Theory of Geography. Of Man, considered as a Moral and Political being; or, Principles of Political Geography.

We have for a long time considered the earth as a physical body, having relations to other physical bodies which surround it, or which dwell upon its surface. No sooner, however, had man become the subject of our inquiries, than we have seen *physical geography* gradually give place to *political*. This branch of our science considers the earth according to its political divisions, and in its relations to the different civilized societies which are established upon it. It is evident that this department of geography has, as well as the others, general principles of its own, which, taken collectively, form a *theory*, and the knowledge of which ought to precede the study of particular descriptions. Of these principles, however, those which, from their having a foundation in the nature of our being, do not change with the changes of human opinion, are few in number. The other relations vary, if not in different kingdoms, at least in different parts of the world; and this induces us to confine ourselves here, to a rapid view of the former class of principles, reserving for the others their proper place in our particular introductions to the description of each grand division of the globe.

Articulate language, the noble inheritance of human nature, forms the great bond of civil society. Few animals have language which is *articulate*, or possessed of distinct and uniform sounds, and even these scarcely amount to ten or twelve inflexions of the voice. No animal has a *rational* language, that is, a language whose different sounds express uniformly and distinctly general ideas. This faculty of expressing our ideas by words, insures of itself the continued exercise of our memory—and without memory where would be the understanding? It is only by means of speech that man is a reasonable being. It is speech which renders the observations, the feelings, the discoveries of the individual, the property of the species; thence arise sciences, arts, civilization, and the unlimited perfectibility of the human race. Language, considered as a moral and physical faculty, appears then to be innate in man; but the choice of sounds, their modifications and their combinations, must have depended upon the will of man; natural logic has unquestionably had its influence, and, in addition to it, the passions of individuals, their habits, the delicacy of the organs, the nature of the climate, and the state of society, would all of them contribute to produce effects. The *primitive tongues*, possessing a very scanty stock of words, simple as the manners of those by whom they were spoken, would naturally be lost by becoming confounded with the more perfect dialects which sprung from them, just as the primitive nations have disappeared, by merging in those nations celebrated in history, to which they had originally given birth.

But although all attempts to discover the primitive tongue appear now to be completely abandoned, philologists still do not despair of fixing the number of *mother tongues*, that is, of those which, in the principal words of which they are composed, in the grammatical inflexions which they adopt, and in the syntax which they follow, present to us a character independent of every other tongue. These mother tongues, however, as they suggest the possibility of a common origin, from their exhibiting some distant traces of resemblance, form among themselves, *families*, without any of them being able to claim pre-eminence in point of antiquity.[a]

[a] The languages of Europe, and the W. and S. parts of Asia have been classed pretty exactly, according to their affinities. In the other parts of the world, they are less certainly known, and do not yet admit of a definite arrangement. It is difficult to decide on the exact affinities of a language, which has never been cultivated, and which can be traced only in scanty, and often inaccurate vocabularies. Much has been recently done, by the labours of missionaries, in the study of various languages, and when their labours shall have been combined by another Adelung, the limits of exact knowledge, as to the affinities of languages, will be more extensive than at present. The following is Adelung's arrangement of the languages, which admit of classification into *Families*. 1. The Bask, in Biscay; peculiar. 2. The Celtic Languages. a. Pure; the Irish and Gaelic. b. The Cimbric; the Welsh and Low Briton (Bas Breton.) 3. The Gothic Languages. A. The Dutch, including the German, the Low Dutch, the Frisic, the Low Saxon, &c. B. The Scandinavian; the Icelandic, Danish, and Swedish. C. The English. 4. The Pelasgic Languages; the ancient and modern Greek; the Latin, and its modern derivatives, the Provençal, Italian, Spanish, Portuguese, and French. The Wallachian is a derivative of the Latin, greatly corrupted with Slavonian, Turkish, &c. 5. The Slavonic Languages. a. The E. division; the Russian, and the Illyrian-Slavonian (the Servian, Croatian, and S. Wend.) b. The Western division; the Polish, the Bohemian, the Lusatian, and the N. Wend. 6. The Lettonian Languages. Old Prussian, extinct; Lithuanian; Lettonian Proper. 7. The Finnish Languages. Finnish Proper, Esthonian, Livonian, Lapponic? Several languages along the Upper Wolga, and the Uralian mountains, (the Permian and Sirjanian, the Vogul, the Ostiak, the Cheremisse, the Votiak, and the Mordvin,) have been arranged with the Finnish, but Adelung thinks them distinct. The Hungarian has been considered a Finnish language, but Adelung thinks it of Tatar origin. The Albanian is of doubtful origin, perhaps Tatar. 8. The Turkish-Tatar Languages. a. The S. or Turkish; the Turkman, Usbec, Bucharian, and Osmanlee or Turkish Proper. b. The N. or Tatar; the Nogay and Crim Tatar, the Kasan Tatar, the Bashkir, the Kirghis, the Turanian or Siberian Tatar, and the Mongolian or E. Tatar (mixed with Mongol.) 9. The Caucasian Languages. A group of languages imperfectly known, and apparently not exactly related to each other. Dialects numerous. Five principal divisions, viz. the Abassian, the Circassian, the Ossetian, the Kistian, and the Lesgian. The Georgian or Iberian, and the Armenian, both to the S. of Caucasus, are insulated languages, and appear to have no direct affinity. 10. The Persian Languages. a. Ancient; the Zend, Pehlvi, and Parsi. b. Modern; the Persian, and Kurd; the former highly cultivated. The Afghan or Pushto, on the confines of Persia and Hindostan, of uncertain affinity. 11. The Shemitic Languages. a. The N. or Aramean; the Chaldee and Syriac; nearly extinct. b. The Middle; the Phenician, Punic, Hebrew, and its dialects (Syro-Chaldee, Rabbinic, and Samaritan;) all extinct, except the Rabbinic Hebrew. c. The Arabic, ancient, and modern, with its numerous dialects (Moorish, Maltese, &c.;) the Geez or Ethiopic. 12. The Coptic, the ancient language of Egypt, nearly extinct; its affinity uncertain. 13. The languages of Nubia and Abyssinia, (not Arabic or Negro,) are supposed to form a particular family. The Amharic is the only one cultivated. 14. The Berber Languages; the original languages of N. W. Africa. The Berber, Shilluk, Tuarick, &c. Not well known, but peculiar. 14. The Hindoo Languages. a. Ancient; the Sanscrit, Pracrit, Magadha, Bali, &c. b. Modern; the Hindostanee (pure, and mixed or Mogul,) Cashmirian, Punjabee, Sikh, Bengalee, Orissa, Guzerattee, Mahratta, Telinga, Tamul, Malayalim, &c.

It may well be asked, By what criterion shall we ascertain the high antiquity of a language? Should it be chiefly composed of *vowels*, as the *Otaheitan*, the *Zend*, the *Basque* or *Iberian*, the *Algonquin*, the *Caribbee*, the *Esquimaux?* But these tongues, almost entirely consisting of vowels, have no mutual resemblance in any other respect. Is the most ancient tongue *monosyllabic*, as M. Adelung[a] would have us to believe? But the Chinese, the *Thibetan*, the *Tonquinese*, and the *Siamese*, which on this supposition would be the primitive tongues, bear no resemblance in their sounds to the language of the Celts or the Negroes. If we are desirous of examining languages as to their grammatical forms and their syntax, we shall find, on the one hand, some, in which the relations of genders, persons, modes of action, and of time, are expressed by the most ingenious, delicate, and profound combinations, as in the Sanscrit, the Hebrew, and the Greek; and, on the other hand, we shall see others in which all these relations, though indispensably necessary to thought, are attempted to be marked only by clusters of vague, obscure, puerile, and arbitrary words, as in the Chinese, the Celtic, the dialects of the Negroes, and those of New Holland.[b] Some might say that these last-mentioned tongues should be the most ancient, as being nearer to nature, in the vulgar acceptation of the word. History however, clearly proves to us, that the Hebrews, the Hindoos, and the Greeks, were at least as ancient as the Ethiopians,[c] the Celts, and the Chinese.

It is then indifferent where we begin to count the links of a chain which is lost in the darkness of ages. We shall first mention the *family* of the *Indo-Germanic* tongues, which extend from the banks of the Ganges to the shores of Iceland. The principal divisions of this *family* follow in the geographical order which we are about to point out. The *Sanscrit* prevailed anciently throughout all Hindostan. From the Sanscrit descend the Devanagara,[d] the purest idiom of India, the Tamul, and several other dialects spoken in the Deccan. Besides a certain number of roots or original words, which the Sanscrit has in common with the Greek, the Latin, the Sclavonic, and the German, it displays also, in its numerous declensions, and in its extended conjugations, the most striking affinities to these mother tongues of Europe, particularly the Greek and Latin.

Persia presents to us three ancient languages: the Zend, which appears to have been the sacred language; the Pelhvi, the language of ancient Media; and the Parsi, a dialect of Persia,[e] whence descend in part the modern Persian and the Kurd. In all this group of languages there are a great many German words to be found; the grammar, infinitely less rich, and less regular than that of the Sanscrit, resembles, in several points, the genus of the German and English languages. The hissing consonants, unknown in the Sanscrit, appear already in the Parsi.

The Greek tongues form one of those genera of which we know best the different species. The Hellenic, or Greek proper, had three dialects: the Doric, which is entirely extinct; the Ionic, to which the modern Greek appears to have the greatest resemblance; and the Æolian, which, being very early transplanted into Italy, became the parent of the Latin. To the class of *Sclavonic tongues*, which, in their declensions, and several other circumstances, resemble the Greek, belong the Illyrian-Sclavonic,[f] the Polish, the Bohemian, the Russian, and the different remains of the Wend tongue. The language of the Dacians and Getæ was probably

All the preceding families belong to the Caucasian Race, including all the Europeans, and all the most civilized nations.

The Mongolian and Malay Races furnish the next most cultivated languages, and civilized nations; but they are not so exactly arranged. In the former are, 1. The great division of Eastern monosyllabic languages, including the Chinese, the Tibetan, the Burman, the Siamese, and the Anamic (Cochin-Chinese and Tonquinese.) 2. The Mongolian Proper; the Mongol or Kalka, the Calmuck, and the Burat. 3. The Mandshur (Mantchoo,) including the Tungusian. The Corean and Japanese, though used by highly cultivated nations, are of uncertain affinity; the latter is not monosyllabic.

In the extreme N. of Asia, the natives are all savage or barbarous; none of their languages have been cultivated; their dialects are numerous. The following principal groups have been established by Adelung, viz. the Samoiede, the Jenisean Ostiak, the Jakut, the Jukagir, the Koriak, the Tchukchi, the Kamtchadale, and the Aino. The Eskimo, of N. America, might be classed with them, rather than with the American Languages.

The Malay Race is said to speak one language extended from Madagascar to the most Eastern of the Polynesian islands, throughout the whole extent of Oceanica. Some doubts have been recently expressed, as to the near affinity of the Malay with the Polynesian dialects. (N. Am. Rev.) It is certain that one language prevails over the whole E. Polynesian islands, from New Zealand to the Sandwich islands. The cultivated languages of this race are confined to the E. Indian Archipelago. Among them are the following, viz. the Malay Proper; the Batta, Rejang, and Lampuhn, in Sumatra; the Javanese (Jawa,) ancient and modern; the Bugis, in Borneo and Celebes; the Ternata, in the Moluccas; and the Tagala and Bissajo, in the Philippines. Some of the Polynesian dialects are now cultivating by the missionaries, particularly the Taitian, and the Hawaian. The Tonga and New Zealand dialects have been grammatized.

The proper American languages were never cultivated by the natives. Some of them have been grammatized by the labour of missionaries. The whole race was in a savage state, except a few nations along the ridge of the Cordilleras, from N. Mexico to Chili, particularly the Mexicans and Peruvians, and even these had not the use of writing, and were rather barbarous than civilized. The most prevalent languages in America are, the Muhekanew or Algonkin (the Chippeways, Delawares, Killistinoes, Chippewyans, Shawanese, Miamies, &c.;) the Iroquois, including the Six Nations and the Wyandots; the Sioux or Dahcotah, (the proper Sioux, Otto, Osage, Kanza, &c.;) the Pawnee; and the Floridian (the Cherokee, Creek, Choctaw, and Chickasaw;) all within the limits of British America and the United States: the Paducas, Anpaches, Moquis, &c. in New Mexico: the Azteca or Mexican, Mixteca, Totonaca, Huasteca, Othomi, Maya, and Pokonchi in Mexico and Guatimala: the Muysca and Goahira, in New Grenada: the Tamanac, the Arawac, and the Carib, on the Lower Oronoco: the Ottomac, the Maypure, and the Omagua, on the Upper Oronoco: the Quichua or Peruvian and the Aymara, in Peru: the Zamuca, Chiquito, and Moxo, E. of Peru, on the S. branches of the Amazon: the Guarani, on the Upper Paraguay, and throughout the greater part of Brazil: the Abipon, the Vilela, the Lule, &c. in W. Paraguay: the Araucanian, in Chili; and the Tchuelhet, and Puelche, in the plains of Patagonia (pampas.)

The Languages of the Negro Race, (divided into the Proper Negroes, the Caffres, the Hottentots, and the Papuans or Oceanic Negroes,) have never been cultivated. The most prevailing are the Jalof, the Mandingo, the Feloop, the Fantee, the Ashantee, the Whidah, and the Congo, among the Western Negroes, the Galla and Shangalla, the Somauli, and the Makua, among the Eastern Negroes; and the Proper Caffre, and Booshuana, among the Caffres. The languages of the Hottentots and the Papuans are among the rudest of all known languages.—P.

[a] Mithridates, ou Notice générale des langues, par Adelung, 2 vols. 8vo. vol. i. p. 1-20.

[b] Celtic scholars consider their language, particularly as early cultivated in Ireland, remarkably copious and refined. At any rate its declensions and conjugations are very numerous. See Neilson's Irish Grammar.—P.

[c] By the Ethiopians must be understood the Negroes, and not the Ethiopians of Abyssinia, who were a family of Arabs. The word *Æthiops*(Αἰθιοψ) signified black, or with a burnt complexion.—P.

[d] The Devanagara is properly an alphabet, not a language. It is the alphabet in which Sanscrit is generally written, and signifies *divine writing*. The purest spoken idiom of India is the Hindostanee.—P.

[e] The Parsi was originally the dialect of Farsistan in S. Persia.—P.

[f] Including the Servian, Croatian, Carniolian, &c., spoken along the confines of Hungary and Turkey, and in S. Austria.—P.

an old branch of this class. In the class of *Germanic tongues*, a very ancient division is perceived: the Frisic, Frank, Saxon, Anglo-Saxon, and Alemanic tongues, form the Teutonic branch; whilst the Mœso-Gothic, preserved in Ulphilas' version of the Gospels, the Icelandic, and the modern Scandinavian, in its two principal dialects, the Swedish and the Danish, constitute the Gothic branch; these branches differ like the Greek and Latin.

In the neighbourhood, and even in the midst of this great family, composed of the more perfect mother tongues, we perceive other families also of great antiquity, but which, in their clumsily constructed grammar, nowise resemble each other, or the Indo-Germanic tongues. Such, in the west of Europe, are the Celtic tongues. The principal species of which are the *Erse*, spoken still in Scotland and Ireland; the *Welch*, or *Cimbric*, preserved in the principality of Wales; and the *Celtic*, properly so called, of which the Low Briton is a remnant that has undergone much admixture.[a] In the Spanish peninsula, there existed an *Iberian* or *Cantabrian* language, of which the *Basque* presents to us some interesting fragments; and which, while it rivals the Celtic in primitive simplicity of structure, differs totally from it in its vocabulary. In Italy and Greece, the *Pelasgian*, *Thracian*, *Illyrian*, *Etruscan*, and other languages, disappeared before they were observed by philosophers. Perhaps the *Albanian* is a remnant of the *Illyrian*.[b]

From the wrecks of all these ancient tongues, from their mixture with the Latin, and then with the Germanic, Sclavonic, and even Arabic dialects, have sprung mixed languages; such as the *Wallachian*, the *Italian*, the *Provençal*, the *French*, the *English*, the *Spanish*, and the *Portuguese*.

To the north-east of Europe, we discover the scattered remains of the great family of Scythico-Sarmatic languages. It is the *Finnish*, together with the *Esthonian* and the *Livonian*, that we may consider as the most distinct from all the other languages of the globe, or at least from all those of Europe. The *Lapponic*, the *Permian*, with various other dialects spoken along the Uralian Mountains, and the Wolga, and the *Hungarian*,[c] originally of the same regions, always exhibit a great family likeness. But in the *Lithuanian*, and its dialects, we see the phenomenon of a tongue differing from the *Indo-Germanic* languages in its radical words, and which at the same time possesses in its grammar astonishing delicacy of structure, and resources unknown to the other *Scythian* languages; and, in truth, an undoubted affinity to the *Greek*.

Caucasus, situated in the centre of the regions in which the Indo-Germanic languages prevail, far from presenting to us the common source whence these languages derived their origin, interrupts the chain of them; and in the *Georgian*, the *Circassian*, the *Armenian*, and some other singularly rude and simple dialects, furnishes us with a distinct family, or rather a distinct group of languages, little known, and unquestionably of great antiquity.

But if we extend our view to Syria, Mesopotamia, Arabia, and Abyssinia, the *Aramean* languages draw our attention by the renown of their ancient civilization, abundance of guttural sounds, vast store of words, multiplied inflexions of the verb, great simplicity, and even poverty in other respects. Such appear to be the common characters of these tongues, among which we shall distinguish the ancient and modern *Arabic*, with its colonies; the *Moorish*, current over all Northern Africa; the *Geez* and *Amharic* dialects, spoken in Abyssinia;[d] and the different branches of the Arabic, which extend along the eastern coast of Africa: the *Hebrew*, in its various modifications from the ancient idiom of Moses to the *Chaldee*, *Samaritan*, and other dialects now extinct, with the exception of the *Rabbinic* or modern Hebrew; the *Phenician*, of which the *Punic* or Carthaginian is the most celebrated branch, and of which the low *Maltese* Arabic preserves perhaps some remains; the *Syriac* or *Aramean*, properly so called; finally, the *Chaldean*, which differs from the Chaldaic Hebrew.

As most of the nations that speak these languages descend, according to Moses, from Shem, this stock has been distinguished by the general name of the *Shemitic* languages, while the term *Japhetic* has been given to the Indo-Germanic languages. But, by admitting these denominations, we are subjected to the inconvenience of attributing to the descendants of Ham all the other languages, from the Celtic to the Mexican, and from the Negro to the Chinese, notwithstanding their evident original difference.

The stock or family of the languages of Eastern Asia, or of the Monosyllabic languages, differs entirely from that of the Indo-Germanic languages. It comprehends the *Thibetan*, the *Chinese*, the *Burman*, composed of the dialects of Pegu, Ava, and others; the Siamese, and the Annamic, including the dialects of Cambodia, Tonquin, and Cochin China. All these languages are more or less deficient in contrivances for marking directly the cases, genders, numbers, moods, and tenses; those who speak them are obliged to supply the absence of grammatical forms and rules of syntax, by intonations, gestures, and a sort of hieroglyphic writing.

The north of Asia contains three or even four genera of languages, infinitely superior to the monosyllabic tongues. The *Turcoman*, *Bucharian*, and different *Turkish* or *Tatar* languages, spoken by the Tatars, properly so called, from the Crimea and Casan to the Tobol, and in Chiwa by the Ottoman Turks, are remarkable for the exactness of their grammatical structure, particularly with respect to conjugations, and for the power of forming compound words with as

[a] The Low Briton *(Bas Breton.)* spoken by about one million in Bretagne, is not considered as a remnant of the ancient Celtic of Gaul, but as a dialect of Welch or Cimbric, introduced by a colony of Britons in the fifth century.—P.

[b] The origin of the Albanian is doubtful. They call themselves *Shipeter*. They are considered as the descendants of one of the barbarous nations, from S. Russia, who invaded the empire in the middle ages. Perhaps they are a mixed race. Their language has some affinity with the Tatar. Their name *(Shipeter)* has some resemblance to *Teptjerai*, (Tatar for a people who pay no taxes,) which is applied to a mixed race, partly Tatar, on the Wolga.—P.

[c] See Note, [d]. p. 189.—P.

[d] The Geez or Ethiopic, is undoubtedly a very old dialect of the Arabic. The Amharic, though mixed with Geez, is of very different origin, and is connected with the original language of Nubia. –P.

much facility as the Greek, the Persian, or the German. Several German radical words occur in these languages. The *Mongol* language, deficient in grammatical combinations, possesses, however, complete declensions; it abounds in vowels and harmonious sounds. The *Mantchoo* language, though full of monosyllabic words, possesses a very complete and very varied grammatical structure; and what is singular, it contains some Greek and German roots. The *Korean* and *Japanese* appear to be closely related to the Mongol and Chinese.[a] The *Tungusian* is a dialect of the Mantchoo; the *Samoyede* differs from it. We are inclined, however, to the opinion, that all the languages of Central and Northern Asia, with which we are most familiar, belong to one family.

The Oceanic countries, from Sumatra to beyond Otaheite, present to us a series of dialects which have all some relation to the *Malay*, a language of the eastern peninsula of India. The same genus of languages is found in Madagascar, but in a more perfect form, with a more methodical grammar. There are unquestionably many general languages scattered over this immense archipelago. The *Tagalic* and the *Bissago* of the Philippine Islands are found in the Molucca and Marian Islands; traces of them are discernible in New Zealand. These two languages have some affinity to the Mantchoo and Mongol. The *Taitian* is distributed through all the small islands of the Great Ocean.[b] More to the west, the Negro tribes of New Caledonia, New Guinea, Van Diemen's Land, and New Holland, speak dialects which probably form one or more separate stocks.

In the Oceanic countries a singular custom prevails: the princes, on their accession to the throne, change several words of the national language. This custom obtains in Africa. The numerous dialects of savages should then be, partly at least, composed of cant words, created and adopted by families, insulated and obliged to distrust one another. This hypothesis has much probability.

The languages of Africa, which are very little known, have appeared innumerable to some travellers. Others think that this is true only of the idioms of the Negroes, properly so called. Indeed, from the Senegal to Cape Negro, the language spoken varies often from village to village. The languages of the Yalofs, of the Foulahs, of the country of Dahomey, of the kingdoms of Benin and Congo, as well as that of inland Nigritia, present, however, the same combinations of consonants, and some common words. In the North, the language of the Brebers or Kabyles, appears to us as the last remains of tongues formerly spoken along Mount Atlas and the Mediterranean. The Coptic, a remnant of the ancient Egyptian, is well known. The researches of M. Quatremere will, perhaps, inform us whether this language is connected with those of the original inhabitants of Nubia and Abyssinia. Upon the eastern side, from Magadaxo to the country of the Hottentots, the geographical names show the prevalence of the *Caffre* language, which, even among the Betjouanas, preserves evident traces of a strong mixture with the Arabic. At the southern extremity of this part of the world, the Hottentots speak a particular dialect, full of clickings and shakings of the tongue, which produce sounds similar to the cries of birds. Their tongues are shorter and thicker than ours.[c]

Could the different character and genius of human languages have been the result of a hereditary difference in the organs of speech? If this principle were admitted, very important conclusions might be drawn from it. For example, the Chinese, the Esquimaux, and the Mexicans, cannot pronounce the letter *r*, they supply its place by *l*. Are they all then of a common origin? But we must carefully guard against admitting with too much confidence these kinds of analogies, since they might grossly mislead us. For example, it has been observed that the compound consonant *mb*, which a European can scarcely pronounce at the beginning of a word, was common to the languages of the Negroes and the South Americans. The observation is correct, but we cannot infer from it the common origin of these tribes, since the confounding of *m* and *b* occurs in the Æolian dialect[d] of the ancient Greeks, who, undoubtedly, are descended neither from Peruvians nor Negroes. There are, in Norway, whole families who commence every word by the consonants *ng*, so common in the dialect of the Negroes of Angola. *B* is confounded with *w* by the Greeks, the Gascons, and the Russians. The guttural sounds of the Arabians are to be found in the German, a language of a different stock. These examples show the great difficulty of ascertaining how much, in such singular anomalies, should be referred to physical and unvarying causes, and how much arises from the influence of mere caprice.

The American languages are scarcely better known than those of Africa. Humboldt thinks that there are in that quarter of the world a very great number of languages independent of one another. What increases their number is the custom adopted by every new dynasty of introducing a new language. Thus, the *Toltec*, the *Huaztec*, and the *Aztec* languages have been successively current in Mexico. These languages, in which a laborious search has been made for some slight affinities to the Mongolian dialects, are extremely complicated both in their etymology and their syntax.

The *Cherokee*, *Iroquois*, and *Algonquin*, or Huron, appear to be the most widely extended of those that are spoken between Hudson's Bay and the Gulf of Mexico: they are poor and plain.[e] The *Esquimaux* or Greenland tongue, which is current over all the polar region, presents an odd fantastic structure, from the joining together of many simple words and even parts of discourse in one single word of immoderate length. In South America, the *Caribbee* or *Galibbee*, a sonorous language, prevails to the north of the river of the Amazons, as it

[a] The Japanese language is polysyllabic, in which it differs decidedly from the Chinese.—P.

[b] The researches of the missionaries in Polynesia, would seem to show that there is less affinity, in those insular languages, with the Malay, than had been supposed.—P.

[c] Lichtenstein, dans les Archives ethnographiques, par Vater et Bertuch, i 259, *sqq.*

[d] Βαρμιτος for Βαρβιτος; Μελλω for Βελλω, the Latin Meo, from the Greek, Βεω, &c.

[e] The languages of the N. American Indians have been considered by Duponceau, and some other philologists, as remarkably refined and complex in their structure (polysynthetic,) and even copious in their vocabulary. Gov. Cass is inclined to call this in question.—P.

did formerly in the little Antilles. Several ancient languages, regular in their composition, have disappeared in New Grenada, Quito, and Peru; but the fine language invented by the Yncas, the *Quichua*, remains in general use even among the Spaniards. The *Guarani* language is so prevalent in Brazil and Paraguay, that the Spaniards and Portuguese, even in several of the towns, speak no other. Different dialects, little known, exist in Chili and in Patagonia. The Pecherais, in Terra del Fuego, have a dialect peculiar to themselves.

These are the principal languages spoken by the human race. How wide the distance in this scale between the dialect of the Negro and the Chinese, who scarcely distinguish the singular from the plural, to the Greek language, in which the most delicate and the most profound thoughts can be fully developed, and permanently fixed! There are languages which have no expression for objects which are not perceived by the external senses, such as the soul, or God. There are some which have no term equivalent to the verb *to be*, or the substantive *world*. But if metaphysical knowledge appears to be denied to the great majority of the human race, all nations, even the most savage, believe in the existence of some invisible beings possessed of power superior to man. The various manners in which nations manifest this sentiment, constitute so many different *religions*—the external acts which are the result of such religious belief, form modes of *worship*.

The name of *Polytheism* is given to every system of religion which admits the existence of several gods, whatever be the nature and dignity which it assigns to them. Of this there are several kinds. The grossest of all is *Fetichism*, or the adoration of Fetiches.[a] By Fetiche,[b] is understood all sorts of animated or inanimate substances, which the priests of these religions hold out to the savages as beings that are enchanted or endowed with some magical and divine power. These absurd superstitions prevail among the ignorant nations of the coast of Guinea, and among a great many other savages. They are blended with a variety of other religions. The *Ox Apis*, and the *Dog Anubis*, were perhaps the Fetiches of the Egyptians.[c] The black stone, worshipped at Mecca before Mahomet, and the god *Phallus* of the Romans, were undoubtedly of the same number.

Sabeism holds a more elevated rank, that is to say, the worship of the heavenly bodies, the sun, the moon, and the stars, either separately, or altogether. This very ancient system, spread over the whole extent of the globe, is blended with all the other systems of superstition. But it no longer exists entirely pure, except among some insulated tribes. It has its name from the Sabeans, or Sabians, an ancient people of Arabia.

Three hypotheses have been formed as to the nature of the universe; *materialism*, or *pantheism*, which supposes that every thing which exists is penetrated with a divine spirit; *dualism*, which admits the existence of two eternal beings, God and matter, or the good and bad principle; and the system of the *Emanists*, which represents all beings, the good and the bad spirits, as having emanated from a supreme God.[d]

Pantheism, modified by the institutions of particular nations, and blending itself with Sabeism, became systematic, or mythological *Polytheism*. Under this name may be classed all those schemes of religious belief, in which the attributes of the Deity are personified as separate divine beings. These systems then, are barbarous and irrational. They are, however, well suited for poetry and the fine arts, and have been received among the most civilized nations of antiquity. They are of several kinds, very different from each other, but reducible to *three* classes. The most gross is the religion of the *Egyptians*, in which the attributes of the divinity were represented under the figure of animals, which may perhaps account for their hieroglyphic writing. This may be termed *zoomorphism*. In the religion of the Greeks and Romans, human nature, exalted however, and embellished, served as a model for divers personifications of the Deity. This then, was *anthropomorphism*, which was varied to infinity. The worship of national heroes modified the polytheism of the Greeks and Romans. Veneration for the dead, a very natural sentiment, mingled with all religions; but of some it appears to have formed the chief part. This was the case with the *Celts*, whom, for other reasons, we number with the Polytheists. Among other nations, such as the Syrians, the Chaldeans, and the Phenicians, the worship of the stars and the physical energies of the earth, appears to have predominated.

In the religion of the *Bramins*, the Supreme Being is supposed to be disguised under different forms, divine, human, and animal. We think that this belief might be considered as the source of all the others, even of Fetichism; but it might be equally asserted that the religion of the Bramins is merely ennobled Fetichism. *Theomorphism*, the religion of the Hindoos, is the best supported of all the ancient systems of worship; it still exists. Two of its branches prevail in the North and East of Asia. The one is *Schamanism*, the head of which is the *Dalaï Lama*, a priest who is supposed never to die. This religion, mixed with Fetichism, is spread over Tartary, Mongolia, and Siberia; the other branch is *Buddism*, or the *Braminic* system reformed by Budda, named also Somonocodom. It is established among the Bramins in Siam and in Ceylon. The ancient religion of Japan is a kind of Schamanism, at the side of which has arisen the religion of *Fo*, which is that of the multitude in China, and which is only a degenerate branch of that of Budda; the priests are called *Bonzes*.

The system of two opposite principles, and that of emanations, must naturally run into each other, whenever the Dualists grant the least superiority to one of

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[a] The religion of the N. American Indians, appears to be a kind of Fetichism. This is particularly observable in their superstitious veneration for conjurors, and what they call their *medicines*. They are disposed to worship any thing possessed of extraordinary and unaccountable powers or properties. The Negroes of Guinea worshipped the galvanic trough of one of the late English travellers as a Fetiche.—P.

[b] A word which comes from the Portuguese word *Fetisso*.

[c] Debrosses, du Culte des Dieux Fetiches, ou parallèle de l'ancienne religion d'Egypte, &c. 1760.

[d] Cudworth, Intellect. System. chap. i. iii. Dupuis, origine des Cultes.

their principles, or the Emanists admit the possibility of a revolt against the Supreme Being. This is the reason why the religions derived from these two sources are scarcely distinguished from each other. They belong altogether to *Monotheism*, if we agree to apply that name to every religion which recognises only one true God, whatever may be the crowd of genii, fairies, angels, and devils, which surround him.

There are three ancient religious systems which have for their basis a dualism more or less avowed. The first is the religion of the Magi, or of Zoroaster, denominated also the *Mithriatic* worship. There is a Supreme Being, from whom emanated two principles, the one good, Oromasdes, the other bad, Arimanes—they fight with each other; but the good will finally obtain a complete victory. This belief, which has been disfigured by the Greek historians,[a] is still preserved among the Parsees or Guebres in Hindostan.

The ancient religion of the Sclavonian nations is less known. Biel-bog, the white god, and Czerno-bog, the black god, appear in it as two antagonist powers. Some authentic records give us an idea of *Odinism*, which prevailed in Scandinavia; Odin, the chief of the good gods; Surtur, the principle of physical evil, the destroyer of the world; Lok, the principle of moral evil, and all the other gods, are in a state of dependence upon Alfader, or the universal Father.[b]

Through so many ingenious errors, or fanciful and absurd dreams, celestial truth was opening up in silence the right path. An obscure and inconsiderable nation acknowledged the absolute unity of the divinity as the basis of their religious faith. *Judaism*, some of whose rites and ceremonies resemble those of the Persian Magi, and of the Egyptian Priests, is now divided into two principal sects—namely, that of the Karaïtes, who acknowledge as divine only the books of the Old Testament; and that of the Rabbinists, who attribute an authority almost divine to the collection known under the name of the Talmud.

Christianity, for the introduction of which the Jewish scriptures and the Jewish polity paved the way, sprung up in the bosom of Judaism, and although in consequence of corrupting its pure doctrines, by mingling with them the principles of the Platonic philosophy, and encumbering its few and simple rites by the inventions of human fancy, it became soon divided into an infinity of sects and systems, it now sheds its benignant and liberal influence over the most civilized countries, and in all quarters of the world.[c]

The Greek or Eastern Church, which most nearly resembles the Christianity of the fifth and sixth centuries, is tolerated in Turkey, countenanced in Hungary, Sclavonia, and Dalmatia, and established by law in Russia. Among its various branches, we may distinguish the *Nestorians* in Turkey in Asia, who at one time were very numerous in Tartary, in Mongolia, and even in China; and the *Monophysites*, who comprehend the Copts in Egypt, the Abyssinians, the Armenians and the Jacobites.

The Latin or Western Church is divided into two great parties.

The *Catholic*, Apostolic, or Romish Church, comprehends within its pale the greater part of France, Italy, Spain, Portugal, Austria, the extensive Spanish and Portuguese Colonies in America, Africa, and Asia, and three-fourths of the population of Ireland. The *Pope* is the spiritual head. The Gallican Church is distinguished by privileges peculiar to itself, which oppose an invincible barrier to the usurpations of the Pope. The United Greeks, who forsook the communion of the Oriental Greek Church, form an inconsiderable appendage to the Catholic Church.

The *Protestant* Churches are divided into three branches: *Lutheranism*, or the Evangelical Church, is supported by the state in Prussia, Saxony, Hanover, Denmark, Norway, Sweden, and Livonia; *Calvinism*, or the reformed Church, is most prevalent in Switzerland, in some countries of Germany, and in Holland; it is the established religion in Scotland, under the name of the Presbyterian Church. We may identify with the reformed church, the *Independents*, or *Congregationalists*, who are so numerous in the United States that they have more than 1000 congregations. The English, or Episcopal Church, is distinguished from the other Protestant denominations merely by its maintaining the order of the episcopal hierarchy. It is the established religion in England; and in Ireland, although the faith of the minority, it is upheld by the strong hand of power. Without advocating any system of intolerance, or wishing to insult men entitled to respect, we shall here give the name of sect to every religious party who have not become in any place sufficiently numerous to have their tenets embraced and patronized by the state. The principal Christian sects are: The *Unitarians*, *Socinians*, or *Antitrinitarians*, whose opinions are protected in Transylvania and in Russian Poland: a very great number of Catholics, of Lutherans, and Calvinists, are secretly attached to this system;—the *Arminians*, or Remonstrants, a party which sprung up in Holland, and who differ from the Calvinists in the opinions which they hold concerning the doctrines commonly called the five points;—the *Mennonites*, at first known by the name of Anabaptists, and disgraced on account of their fanatical excesses, but now the most peaceable of all the sects;—the *Baptists*, a numerous party in America, where they occupy 868 churches; they resemble the Anabaptists, and may be termed modern Anabaptists;—the United *Moravian Brethren*, or Hernhutters, a sort of monastic institution, who, in other respects adopt the tenets of Lutheranism, and who carry together the blessings of religion and the useful arts into the remotest and most savage tribes;—the *Quakers*, or Tremblers, benevolent enthusiasts, numerous both in America and England;—the *Shakers*, the *Dunkers*, and other associations similar to the Quakers;—the *Swedenborgians*, or followers of the Baron Swedenborg, a sect of mystics to be met with in Sweden and England;—lastly, the *Methodists*, who

[a] See the article Persia.
[b] See the article Scandinavia.
[c] Brerewood, Recherches sur la diversité des langues et des religions, trad. de l'anglais par La Montagne. Paris, 1640.

are distinguished by an extreme *method* or strictness in morals, and are very numerous in England, and still more so in the United States.

Christianity, besides all the enemies which have sprung from its bosom, has seen arise close by its side a rival at first dangerous, and still troublesome, in *Mahometanism*, or, according to the manner in which Mahometans themselves speak of it, *Islamism*, that is the Orthodox church. This religion is merely a confused mixture of Judaism and Christianity, with some poetical ornaments. The Mahometan creed prevails in the greater part of Asia and Africa, as well as in Turkey in Europe, and it is tolerated in Russia. Mahometanism comprehends several sects. The *Sunnites*, although divided with regard to discipline into four parties, agree in reckoning the book of traditions, or the Sunna, in the number of their sacred writings, and in considering Omar and his successors as the legitimate Califs. This party is the most numerous: the Turks belong to it.

The name of *Schiites* means Separatists. The Sunnites give it to all those who differ from them; they reckon six classes, each split into twelve subdivisions, which make 72 heretical sects; for the Turks have thought, like Bossuet, that the multiplicity of heretics furnishes a plausible objection to their doctrines. But in truth, there is only one considerable party among the Schiites, that of the followers of Ali, who reject the Sunna: their creed is dominant in Persia.

It is difficult to speak with precision as to the number of followers belonging to each religion actually existing in the world—a misplaced zeal leads the different parties to exaggerate their numbers, as if there were no truth in Seneca's observation, that a great majority often indicates a bad cause.[a] Infidel writers in particular, have thought they were rendering an important service to their cause, by ridiculously exaggerating the numbers of Mahometans and Pagans, not considering that truth will be always truth, whether it be believed by many or by few.

The following numbers may be regarded as nearly approaching the truth:

Catholicism,	in Europe - 88 millions.		116 millions.
	out of Europe 28 —		
The Greek Church,	- - - - -	70	
The Protestant Churches, &c.	- - - -	42	
	Total of *Christians*.		228 millions.
Judaism,	- - - - - - -	4 to 5	
Mahometanism,	- - - - - -	100	110
Braminism,	- - - - - - -	-	60
Schamanism, or the religion of Dalai Lama,	-	-	50
Buddism, comprising the religion of Fo, &c.	-	-	100
Fetichism, and various other beliefs,	-	-	100

Languages and religious creeds are the ties of *moral society*, which often survives the fall of *civil and political society*; but it is the latter which determines the boundaries of states and empires, which it is the province of political geography to describe. We must then take a general view of the varied forms of this society.

The ties which unite husband and wife, parents and children, formed the family or domestic society. The relation of master and servant had its origin when society was in this state. The weak not being able to assert their rights, or procure the means of subsistence, must have soon resolved to claim the protection of the strong. Those families that happened to live in the same neighbourhood, would, after quarrelling for a while, at last agree to live in harmony together. Certain rules would be established among them, not yet to be considered as laws, but as customs. The union of these families did not form a state, but only a civil society. These small societies must soon have perceived that their customs and observances required to be fixed, and to be invested with the character of laws. Men of superior natural capacity became the unknown lawgivers of these hamlets or villages. As soon as the various relations in which men stood to each other were fixed by laws, political society commenced.

But this was a society without government, and soon became a prey to the evils of anarchy. Experience of these evils taught men that a physical force is indispensably requisite to support the laws, which of themselves have a force purely moral. A government is thus established under some form or other. The convention which fixes the original laws of civil society, is called the social compact; that which fixes the existence of the form of a government, and adjusts the circumstances connected with it, is called the constitution. By this last convention, civil society is constituted a state, or, if the term is more agreeable, a republic; for this last word, derived from the Latin, originally signifies every civil society having a government and laws, without reference to the form.

A government is the union of physical force established by the will of civil society to maintain the laws and the constitution. The force of the government, regulated by the established laws, is called the supreme power. The supreme power may be divided into different branches, as, for example, the legislative power, subdivisible into the proposing, the deliberating, and the discerning power; the executive power subdivisible into the administrative, the judicial, the military, and the power of supreme inspection. These divisions are partly arbitrary. The manner in which the supreme power is organized, subdivided, and concentrated, is called the form of government. The supreme power represents the national sovereignty, which is nothing but the supreme power not organized, existing in the hands of a civil society without government.

Forms of government are innumerable; but we shall point out those most generally known, by advancing from the state of the greatest physical dissemination of powers, to that of their greatest concentration. These two extremes approach each other more nearly than is imagined.

Pure democracy exists in that state in which the supreme power is immediately exercised by the majority of the nation: this form of government differs from the state of primitive civil society, in which all equally rule. Commissorial democracy is a state in which the supreme power is exercised by a council immediately chosen from the people, revocable, and responsible. Such functionaries are not then the representatives of the nation, but merely its proxies and commissioners. We term a representative democracy that state in which the supreme power is exercised by

[a] Argumentum pessimi, turba.

magistrates, chosen by the people, who represent them, and who, consequently, taken collectively, are sovereign and not responsible. This form is subdivided into a pure representative democracy, when the people themselves directly choose their representatives—and into an electoral representative democracy, where the people choose electoral bodies, who again elect the representatives.

Elective aristocracy resembles representative democracy. It is when the people, either mediately or immediately, choose their magistrates, not indifferently from among the citizens, but from a certain class determined by law. Elective aristocracy is pure or free, when the people have created the privileged class, or the aristocratic body,—when admission into that body is open to all citizens,—when the members of that body are amenable to the supreme power in the hands of the people. Simple or pure aristocracy is, when the people have chosen once for all, as their plenipotentiary representatives, a body which governs, and which is renewed without the concurrence of the people. Every form of government, compounded of those which we have just named, is called an aristo-democracy. When the aristocratic party seem predominant, we have a temperate aristocracy; when the democratical, we have a temperate democracy. Rome, after the expulsion of the Tarquins, was an hereditary oligarchical aristocracy, which gradually changed into an aristo-democracy, composed of all the other kinds. The Patricians were the hereditary aristocratic body; the senate a free elective aristocracy; the assemblies of the people represented the democracy.

A democratic monarchy is a democracy in which the supreme power is partly exercised by an individual and partly by a democratic body. As the supreme power may be variously divided, it is impossible to ascertain the number of the different kinds of democratical monarchies. It may be hereditary, when the nation has chosen a certain family, or elective, when at each vacancy a monarch is chosen. The right of election may be vested in the people, in an electoral body, or in a single elector. These variations are common to other kinds of monarchy. The legislative power may be divided between the commissioners of the people and the monarch, or it may belong to the former only. The judicial and military powers may be dependent upon the monarch, or upon the body of the nation. The democratic body itself may be chosen without or with the concurrence of the monarch.

Aristocratical monarchy is a state in which the supreme power is jointly shared by the monarch and the aristocracy. This latter body may be a free elective aristocracy, when an assembly of representatives chosen by the people form the council of the monarch; an hereditary elective aristocracy chosen by the people, or by the monarch, or by both conjointly; or lastly, a pure and perpetual aristocracy, independent alike of the people and the sovereign. Such were the nobility in most of the European states before the present epoch. The aristo-democratic monarchy is a government composed of a monarch, of an aristocratic body, and of a democratic body. By a mixed government is generally understood a monarchy of this description. The different combinations of this form are so multiplied that it is impossible to class them.

A pure or absolute monarchy is a state in which the supreme power is entirely confided to one individual, or, in other words, a state in which the majority of the nation is represented by a single individual. Absolute monarchy differs from despotism in this, that the monarch holds his power of the nation, either by expressed or by tacit consent; the despot, on the contrary, pretends to hold his power from God, or from his own sword The dictatorship was a kind of absolute monarchy, elective and temporary, in the Roman republic.

The word anarchy literally means the absence of a government. Taking the word government in its true and honourable signification, it is evident that anarchy may arise in two ways: 1st, from the non-existence of any supreme power in civil society; 2d, from the preponderance of unconstitutional power, exercised in an arbitrary manner and without the form of a government. Anarchy may be modified in a thousand ways. The following are the forms of it which appear to be most worthy of being defined.

Ochlocracy, or popular anarchy, takes place when a mob or a multitude unlawfully usurp a supreme power. According to this definition, even the majority, when they are not legally constituted sovereign, can exercise only anarchical power. Oligarchy occurs when a small number of individuals or families exercise the supreme power without having been chosen by the constitutional sovereign. It differs then from pure aristocracy. Demagogy is when one or several individuals, without legal appointment, lead and manage the people at their will, actually exercising the power which they seem to leave in the hands of the multitude. The word tyrant signified originally chief or monarch. Virgil employs it more than once in this honourable sense, but it was afterwards limited, to denote him who, in a republic, had usurped the power of an absolute monarch. This is the ordinary sense of the term in the Greek and Roman authors. The moderns use the term to express violent and cruel abuses of authority in all kinds of government.

Despotism has been confounded, sometimes with tyranny, sometimes with absolute monarchy. Despotism is absolute power, which is not derived from a lawful source, and which consequently acknowledges no limits. The despot pretends to be master of his country and of his subjects, just as a private person is proprietor of his estate or his cattle. Despotism is not necessarily tyrannical, or cruel and violent—it is not absolutely incompatible with some administrative forms, and some institutions which properly belong to regular States, or even to Republics.

It would be improper to class with these forms of government, or of anarchy, created by man, the singular state termed theocracy. "It is," say the Theologians, "a government instituted by God himself, and in which the magistrates govern in the name of God." Such was the constitution of the Jewish people—with them theocracy was united first to democracy, and then to monarchy. The popes, in the dark and middle ages, attempted to establish a theocracy upon a great scale.

We have still to notice the federal systems, which are the unions of several independent States, under a

superior authority chosen by themselves, and which are invested with powers more or less extensive, to maintain mutual order, and to furnish the means of defence against external enemies. We may term a confederation, of which all the constituent members are on a footing of equality, a democracy of States: such is that of America. There have been, however, confederations with a chief or presiding power: the late Germanic empire was of this nature. Confederations sometimes have subjects in common: the Swiss had several districts in this manner.[a]

Political geography considers in societies of men, besides the general tie, or the form of government, the particular ties which bind individuals to society, and which result from the station assigned to these individuals, or from their division into classes and orders.

In the most savage state, insulated man procures directly for himself the little which is necessary to supply his wants or to gratify his wishes. As soon as families begin to draw near each other, they unite together for accomplishing their common labours; but when the number of families augments, the society, becoming larger and more powerful, has recourse to the division of labour. The different products of each branch of industry are then reciprocally exchanged. These exchanges being not without inconvenience, means are sought for to give them facility and despatch. Some measure, to ascertain the comparative values of the different commodities, is adopted, either some article in general request, as corn or cattle, or some reputed precious substance, such as gold and silver. This token becomes money: the productions become merchandise; and instead of being bartered, they are purchased. Some sagacious observers now perceive that gain is to be got by buying and selling; they become intermediate agents between the consumers of produce and those who raise or work it; and here commence the first rude attempts of commerce. Ere long, the administration of affairs, and the defence of the territories of the state, become functions too laborious and too complicated to be gratuitously discharged; the functionaries receive a salary, and instead of warriors we have soldiers. At the same time, every inch of ground would receive its master; property of every kind, after having passed from one hand to another—chance favouring some individuals, and address serving others—would at last become fixed. Those who had been unfortunate or unskilful, finding the impossibility of producing any thing by their own efforts, would let out their strength or their dexterity to others. From society thus at last completely constituted, various classes originate.

The productive class comprehends all those who draw from the earth or some other element, any productions useful to society; cultivators of the soil, fishermen, vine-dressers, miners, &c. There are tribes entirely composed of one or more productive classes. Such are the pastoral tribes, or Nomades; the fishermen, or Ichthyophagi. In civilized states, there exists one productive class of a peculiar kind;—the man of science who enlarges the empire of knowledge, and the man of letters, who purifies the taste, or refines the sentiments, or elevates the morals and manners of the age, equally contribute to the production of true national riches of inestimable price and perpetual duration.[b]

The operative class consists of those who, by various processes, convert raw produce into artificial produce. When such processes eminently require genius and taste, they obtain the name of the fine arts. When they chiefly demand corporeal strength and dexterity, they are called the mechanic arts. A manufactory is an establishment where an art is conducted on a large scale. The name of *work*[c] seems to denote one of these establishments in which extensive and powerful machinery is employed.

The commercial class is composed of merchants properly so called, who buy and sell, either on a great or small scale, the productions of nature and of art; of different kinds of correspondents or agents,[d] who facilitate the execution of purchases and sales; of bankers and brokers, who confine their operations to the representative signs of merchandise; and, lastly, of mariners and carriers, in so far as these are proprietors of their means of conveyance, and do not fall to be ranked under the class of mercenaries.

We include in one class the public functionaries, and the officers of the sea and land forces. They are equally invested with a greater or less proportion of the force of the state; they are equally the agents of the supreme power.

The last class comprehends the mercenaries of every kind who let out their labour to private persons, or chiefly to the community. It is composed of labourers and domestics. This last class is most numerous in the states where luxury prevails.

The numerical proportion in which these classes are met with in a state, is one of the most interesting questions of statistics. According to this proportion it is that we decide whether we are to denominate a nation agricultural or commercial.

Classes have their foundation in the very nature of society itself, but castes and orders are created by laws and institutions. By the word caste is understood an hereditary class, exclusively assigned to one species of occupation. This system of division existed in Persia, Arabia Felix, and Egypt, and it still exists in India. It is accounted for in a satisfactory manner, by referring to the original difference of the primitive tribes, whose union formed the nation. The caste of priests and that of warriors, in Egypt, were probably two clans some-

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[a] The territories of the U. States are governed in a similar manner. They have a voice, but not a vote, in the national legislature, to whose laws they are subject; and although they elect a legislature of their own, their executive and judiciary are appointed by the general government. The District of Columbia is, however, without a local legislature, and is governed entirely by the laws of Congress.—P.

[b] Although the people of the U. States are eminently disposed to patronize men of practically useful talents, particularly professional talents, yet they have not generally learnt to estimate the value of mere scientific and literary excellence. The abstract sciences, the *Belles Lettres*, and the fine arts, are certainly not encouraged in this country We have as yet no regular body of such productive labourers.—P.

[c] "Fabrique," corresponding to "*works*," as iron-works, cotton works, &c.—P.

[d] "Commissaires," commission-merchants, factors, &c.—P.

what organized and disciplined, which had reduced to a state of subjection several tribes of husbandmen and shepherds. The conqueror disdained to intermingle with the vanquished; and the laws afterwards sanctioned and perpetuated a system of separation which accident had originally established.[a]

The political orders in the states of Europe differ essentially from the castes, in this, that they have no occupation which is exclusively reserved for them, or if they have it, like the clergy, it is not hereditary. In the middle ages, when the armies consisted of cavalry, the order of the nobility partook much of the nature of a caste. The nobles now are merely an order of the state. The citizens, commonalty, or third order,[b] and the peasants, form, in some states, orders recognised by the constitution. In Sweden, the order of peasants possesses much influence. The same was the case in the Tyrol before the late events. There are still, however, some countries, particularly Russia, where the husbandmen, subjected to the yoke of personal slavery, form a real *caste*, condemned to a state of abject and perpetual degradation.[c]

In despotic states, as in Turkey and in China, there are no orders.

Slavery renders all individuals equal. In Europe, it is the "*esprit de corps*," the corporation or professional spirit of the orders of the state,—it is the equilibrium resulting from their various prerogatives and interests, contending with each other, and with the supreme power, which secures political liberty. It is, therefore, in describing Europe that we shall have to explain the institutions of chivalry, the honorary distinctions, and other institutions, whose object it is, either to mark the degrees in the scale of society, or to render the distance between them less felt and less perceptible.

It would be rather uninteresting to enumerate the various denominations which designate the different states. The use of the terms empire, kingdom, sultanat, khanat, and others, will be learnt in the descriptive part of this work. It would be equally useless to consider in this place, the titles which the heads of states assume, from the modest president of the United States, to the vain-glorious Emperor of China, who is called the son of heaven, and who is, however, only the silly imitator of the Persian monarchs, who styled themselves kings of kings, princes of the stars, and brothers of the sun and moon.[d] Empty sounds have no influence upon the prosperity or the power of states.[e] Political geography regards, as almost unworthy of notice, the arms and colours by which the different states mark their ensigns, their flags, and their frontier posts.

It is a matter of much greater importance to ascertain the material resources of the state. This is the particular object of an extensive science, termed political arithmetic;[f] the results, however, of this science must have a place in the descriptions of political geography.

The first element is the value of land, and of its produce. Here the different productions of the three kingdoms of nature are classed according to their usefulness in life, and their value as articles of merchandise. The government itself knows, only by approximation, the value of what agriculture, the fisheries, and the mines produce, and what is the exact proportion between the commodities which the nation sells, and those which it buys. Governments beside, do not often publish even the imperfect information of this kind which they possess. Political geography, therefore, cannot absolutely warrant the accuracy of the lists of productions, of exports, and imports, which it is obliged to collect with so much trouble. To render these details as useful as possible, it is necessary to know the proportional values in which lists of this kind are made up; the monies, the weights, and the measures of each country. This subject, which presents a different aspect in every state, will come to be considered in our particular descriptions.

In the second rank, among the elements of the national resources, should be placed commercial and manufacturing industry. It was this which accumulated on the rock of Tyre, on the barren coasts of Attica, and on the flat sandy shores of Alexandria, the treasures of the ancient world; and it was this which, in modern times, raised Venice and Holland to greatness. Here political geography should consider the situation of the coasts of a country, the number and nature of its ports, and the state of its great roads and canals; circumstances, all of which directly influence the progress and prosperity of national industry. It is likewise necessary to attend to the various commercial institutions, such as the great national banks, which accomplish the rapid exchange of the signs that represent the value of merchandise, and the commercial and trading companies, among which there are some that possess in sovereignty vast provinces beyond the boundaries of Europe.

The population of a state forms the third element in its resources. We have seen in a preceding book, that the proportions between the deaths, the births, and the number of living inhabitants, enable us to approximate nearly to the population of a country; but it is a census alone which enables us to ascertain it with ex-

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[a] Compare Heeren, Views of the Politics and Trade of the Ancients, i, 361. (In German.)

[b] "*Tiers-Etat*, or rather *tierce etat*, that is, tertius status, the third order."—M. B.

[c] The slaves, in this country, may be considered as a *caste*. Though they are not bound to the soil, like the Russian serfs, nor confined by the laws, to some one hereditary employment, like the *castes* of Indostan, and ancient Egypt, yet they are dependant, for their employment, on the will of their masters. If they were entitled to liberty, by presenting a certain sum, or performing certain services, there would be some relief from this perpetual burden of *caste*; but even this is denied them. An American politician has recently pronounced his opinion, that slavery is inherent in the nature of man, and sanctioned by all laws, divine and human. In this, he has confounded the relation of employer and employed with that of master and slave. In the former the obligations are mutual. Not so in the latter. In the former there is always a chance of improvement in the employed. The slave must always be a slave, and if his condition is improved in consequence of his own exertions, it is the favour of his master that makes it so. Though there are inequalities of condition in all societies, yet in free societies all have legally an equal chance to rise, but in a society of masters and slaves, the latter are prevented from rising by the arbitrary enactment of laws, not by natural circumstances.—P.

[d] Ammian. Marcell. xvii. 5. xxiii. 6.

[e] Becmanni, Syntagma Dignitat. Illust. Dissert. iii. cap. 3.

[f] See the works of Young, Petty, &c. quoted p. 194. The general Treatises of Statistics, by Achenwall, Toze, and Mense. (in German,) and the Statistical Account of Scotland by the Parochial Clergy.

actness. Even when we have an authentic census, we should beware of trusting to it with implicit confidence. The same individuals are often counted twice, which happens every time that the inhabitants of the country are numbered in summer, and those of the towns in winter.

The number of inhabitants is the foundation of every good system of finance; the more individuals a country contains, provided they have the means of subsistence, the greater progress will commerce and manufactures make; and consequently the greater the increase of the revenues. The number of inhabitants ought equally to determine the number of the troops. It is computed that the men capable of bearing arms, form about the fourth part of the whole inhabitants. The greatest effort, however, that the most warlike state can make in a case of extreme necessity, is to arm the eighth part of its population. No example even of this has occurred in modern history.

Let us observe also that the more a mass is concentrated, provided that it has free space sufficient to move in, the more energy it will acquire. A small populous country, therefore, is, in proportion, more powerful than a state of vast extent thinly peopled. A country is looked upon as populous, when it contains about 100 inhabitants to the English square mile. England is peopled at the rate of 198 to the square mile; but Ireland and Scotland present a less favourable proportion; the former being 122, and the latter 56; Wales has 80 to the square mile. Holland had, before the troubles of 1788, and the revolutions which followed them, 212 inhabitants for each square mile, which makes 1908 for each square English league. The Island of Malta is probably the most thickly peopled country; it had more than 6000 souls to the square league; but these are to be regarded only as rare local exceptions. And it is common enough to find, in European Russia, governments which have not more than 20, or even 10 inhabitants, to each square mile.[a]

The attempts which political arithmeticians have made to compute the value of the aggregate revenue of a whole nation, arising from the employment of its capital in the cultivation of the soil, and in the various branches of commerce and the arts, have hitherto produced only proximate results, more or less accurate according to the correctness of the data from which the calculations have been made. Political geography merely exhibits the sum of the revenues at the disposal of the government of each state, and the principal sources whence they flow. In many countries this information is furnished by the *annual budget*, which is the name given to the table of finances laid before the aristocratic or democratic body, sharing in the exercise of the supreme power. As the budget, however, is sometimes intended to neutralize the unfavourable impression which may have been made by the increase of the public debts of the state, it occasionally exhibits fallacious details: in absolute monarchies this device is superfluous. But the correct estimates often remain buried in the ministerial *bureaux*, until some lucky chance, or the will of an enlightened sovereign, ushers them into useful publicity. As it is only in Europe that there exists a regular system of finance, it is in the description of that part of the world that we shall point out the different species of taxes and customs, and all the ingenious artifices by which civilized governments force money out of the pockets of their subjects; while the chiefs of barbarous nations carry off, *in kind*, and most frequently in an arbitrary and irregular manner, the articles which they require.

An armed force, naval and military, is unfortunately, but necessarily, an object of the first importance to every government.

Savage tribes, and even some half-civilized nations, are accustomed to march against their enemies all the males fit to carry arms. Nothing prevents them from doing so, as fishing and hunting are occupations which a horde of savages carry along with them. In other circumstances, the women may be sufficient for the employments of agriculture and the tending of cattle; but as soon as labour is multiplied, and, in consequence of this, comes to be divided, that is, as soon as the agricultural, manufacturing, and commercial classes, have each a separate existence and place in society, it is impossible to arm and to bring into the field the entire mass of a nation, without completely suspending the exercise of those trades and occupations on which its subsistence depends. It therefore becomes necessary to form a class exclusively devoted to the trade of war; such was, in the middle ages, the design of the order of nobility and of chivalry; but the invention of gunpowder and artillery, the introduction of a new system of fortification, and the perfection to which tactics have been brought, have converted the formerly simple and almost mechanical art of war into a profound and extensive science, to the study of which many years must be devoted. This consideration, strengthened by motives of ambition and policy, gradually paved the way for the establishment of standing armies. The European powers have had, for more than a century and a half, a certain number of troops in a state of perfect discipline and equipment, ready to march at a moment's notice. In supporting these troops, one-third, and often one half of all the public revenue is consumed. The land force, or the army, is composed of four principal parts, or arms, with their subdivisions; namely, the infantry, or combatants on foot; the cavalry, or combatants on horse-back; the artillery, whose province is to work those engines of destruction, on the skilful management of which the issue of battle frequently depends; and the engineer department, which conducts the defence and attack of fortified places. In the description of a kingdom, not only should we point out the number and situation of the fortresses, the passes and defiles of greatest importance, as well as the number of troops which it maintains; but it is farther necessary to mention, whether these are regular troops, or bands without discipline or military science, and also to specify the physical advantages and disadvantages of the frontiers.

In like manner, it is not enough to know the number of ships of war of which the navy of a state consists. We must also ascertain whether it possesses an ad-

[a] Busching, Introduction a la connaissance geographique des Etats de l'Europe.

equate number of skilful officers and experienced sailors. We must observe whether it comprehends in its dominions extensive coasts, furnished with safe and commodious harbours, or touches the sea only in some insulated points. According to circumstances, a state requires a fleet of ships of the line, and frigates to fight on the open sea, or a flotilla of gun-boats to defend its coasts, its straits, and its ports.

Finally, states have also, besides their own peculiar forces, a force of situation depending upon their external relations; and particularly, on the alliances, whether diplomatic or natural, which render them the friends or enemies of each other. Th equilibrium resulting from the alliances of the different European nations, is called the "balance of power." This political equilibrium has frequently been subverted; but it is notwithstanding of importance to examine the principal bases on which it rests, as shall be done in our description of Europe.

The moral state of a nation is the result of all these political and social relations we have been specifying. This state is indicated by various signs, of which the political geographer ought to notice the most striking.

The mode of dress is more than a simple object of curiosity; the loose flowing habit of the orientals, and the tight clothing of the European, exert an influence on their physical and moral constitution. The nudity of certain nations procures to them corporeal advantages, an agility, a strength, and a robustness of health, unknown to nations whose limbs are encumbered with garments; but this superiority is more than counterbalanced by extreme indolence, and by feebleness and torpor of understanding. The custom of painting the body, whether by imprinting, or marking figures upon the skin, or by simply besmearing it with a coat of colouring, marks the infancy of civilization, and the first workings of vanity. Rank and dignity are frequently indicated by the vestments, or by the ornaments with which they are embellished. A particular kind of sash of cotton cloth[a] is the distinguishing badge of royalty in Otaheite. The priests of Siam reserve to themselves the privilege of shaving their eyebrows. A necklace of human teeth supplies the place of the star, in the order of negro nobility.

The ordinary habitations of a people, are an almost infallible index of the degree of civilization at which they have arrived. The human race may be divided into four classes, according to the four kinds of habitations which follow, 1*st*, Caverns in the rocks, and under ground. Those who make these their common abodes, are called Troglodytes. 2*d*, Huts of earth, branches of trees, stones, or some other substance, either in the natural state, or coarsely wrought. 3*d*, Tents; these moveable dwellings, in the opinion of wandering pastoral tribes, appear preferable to our palaces. 4*th*, Houses, which may be defined huts brought to a state of perfection; for even the most superb colonnade, is merely a noble imitation of the coarse beams which supported the thatched roof. We find in Europe, houses constructed of unsquared beams—of beams that are squared and lined with wainscoting—of prepared clay and squared timber—of bricks and wood—of bricks alone—of unhewn stone—of hewn stone—and of marble.

The name of a city or town, strictly speaking, is not given to a collection of houses on account either of its extent or its population, but in consequence of certain privileges which the place enjoys. The right of exercising the various arts and trades, and of conducting commerce, serves in most countries chiefly to distinguish cities and towns from villages. Villages are sometimes larger than towns, for example in Silesia; but they have commonly no privilege to distinguish them from hamlets and other assemblages of houses in the country. Burghs are places which enjoy a portion of the rights granted to cities. In other respects, these words admit of different senses, according to the laws and customs of different countries.

Utensils and instruments are objects no less worthy of the attention of a philosophical observer. The bows, the javelins, and the nets of savages, often deserve to be admired for the perseverance and dexterity that were required to produce them.

The European is accustomed to make almost every nutritive substance minister to his support, or to the gratification of his palate. But there are nations that live almost exclusively upon one kind of food. Frugivorous, carnivorous, and ichthyophagous tribes are distributed over the whole surface of the globe. The taste for horse-flesh appears peculiar to the Mongols, Tartars, Finns, and other descendants of the Scythians, and even to the Sclavonic and Gothic nations. Both ancient and modern writers place the Acridophagi, or eaters of locusts, in Africa. Some of the American tribes visited by Humboldt, devour a species of clay.

Respecting Anthropophagism, or the horrible custom of eating human flesh, it appears to be proved that it does not belong exclusively to any nation; all savage tribes are addicted to it, either from the impulse of a ferocious hatred of their enemies, or by the dictates of an atrocious superstition, or finally, in consequence of extreme want. Not only do modern accounts assert that the practice obtains in the greater part of the nations of Africa, America, and Australasia; but we discover from several passages in the ancients, that it was at one time prevalent in Europe. The poets ascribe it to the Cyclops and Lestrygons, whom they place in Italy.[b] Historians bring this charge against the Scythians,[c] the Cimbrians,[d] a tribe of Caledonians,[e] and other nations of the north. The heroes and gods of Homer, employ expressions borrowed from Anthropophagism; Jupiter reproaches Juno for desiring to eat, either raw or dressed, King Priam and his children. Human sacrifices were known among the Greeks and Romans, as well as the Celts, Scandinavians, and oriental nations. These horrid sacrifices appear to have been often succeeded by a repast still more horrid. The disgusting practice of burying the dead bodies of

[a] "*Pagne*," a wrapper of cloth, from the waist to the knees. In Otaheite, it must have been made originally from the bark of the paper mulberry.—P.

[b] Homer, Odyss. ix. 290. x. 129.

[c] Herod. iv. 18—20. Plin. viii. 2.

[d] Diodor. v. chap. 32.

[e] Hieronym. ap. Buchan, Rer. Scotic. ii. p. 55. Edit. Wechel.

their relations in their own bowels, is attributed to the Issidones,[a] and the Massagetæ ;[b] to several tribes of India ;[c] to the people of Thibet and the Marian Islands ;[d] and to the ancient Irish.[e]

The desire of procuring a momentary elevation of spirits, has caused the invention among all nations, of intoxicating liquors. Their different properties, from the generous wine of Europe to the loathsome ava of the Otaheitans, deserve to be pointed out in the geographical descriptions of the respective countries.

From the immense variety of customs, which impart to social life, in every nation, its peculiar features, political geographers select the most striking, namely those which are most closely connected with morals, and which serve to illustrate the history and filiation of the species. Such is the circumcision practised among the African nations which do not profess Islamism ; the custom of embalming dead bodies, common alike to the Guanches of the Canary islands, and to the ancient Egyptians ; the fashion of letting the bodies of the dead dry and wither away in the air, common to the Otaheitans and the ancient Medes ; the custom prevalent among the females of India, and the wives of the Wends and Scandinavians, of immolating themselves upon the tombs of their husbands ; and in general the ceremonies observed at marriages, births, and funerals, present resemblances that are often highly interesting.

Civil laws sometimes present singularities which deserve to be marked in the description of a nation. But it is sufficient to notice regulations which punctiliously prescribe the silly ceremonies of a degrading etiquette ; punishments revolting to humanity ; graduated scales of murders, and mutilations, and tortures ; superstitious ordeals, still prevalent among different nations, and a thousand other similar observances of ancient barbarism, or the bequeathments of a more recent despotism.

The intellectual state of society closes this lengthened view of the various aspects under which nations may be contemplated. Do they possess an accumulated store of the discoveries of genius, and of the observations of wisdom ? Do they cherish, in the sublime and beautiful effusions of poetry, the expression of the noblest sentiments of humanity and patriotism ? Do men of science and literature occupy the honourable rank to which they are entitled ? These are questions which require to be satisfactorily solved before we can determine the progress which a nation has made in civilization and in morals.

The general result, the collected effect of all these aspects and relations, to which our attention has been drawn, constitutes the character of a nation. Nations may be distributed into three general classes. Savages are those, who are ignorant of the art of writing, or of fixing their thoughts by means of conventional signs equivalent to writing. Their vague and unsteady ideas are attached only to objects which strike their senses ; they delight to adorn their persons in a manner which to us appears ridiculous ; they are passionately fond of bodily exercise, and in this respect they infinitely surpass us. Their industry is generally confined to a little gardening, to fishing, and the chase. Some of them however, produce specimens of beautiful workmanship, and have even commodious and elegant habitations. The class of barbarians, or men half civilized, comprehends every nation which, by writing, by written laws, by a religion expressed in ceremonial observances, or by a more regular military system, has evidently emerged from the savage state. But the information which such a people possesses is as yet only an indigested mass of incoherent observations : their arts are exercised as it were by routine—their policy is limited to the defence of their frontier, at the moment of danger, or to offensive operations conducted without a plan. Their progress is in general slow and uncertain, because, even in advancing towards civilization, they have no proper conception of the great objects at which they should aim. A civilized nation is that which has arranged its knowledge in the form of sciences ; which has elevated the mechanical to the rank of the fine arts ; which, to express the various sentiments of the human heart, has created the "Belles Lettres ;" which is possessed of a fixed system of legislation, of policy, and of war, calculated not only for existing circumstances, but for ages to come—a nation in which Christianity, undefiled by superstition or enthusiasm, displays its proper influence in the purification and elevation of the public morals,—a nation, finally, which recognises the great principles of public law, by acting in time of peace as the friend of every other state, and by respecting, in time of war, the property of defenceless citizens.

The general character of a nation, being the result of all the physical circumstances in which it is placed, and of the political institutions, which modify these circumstances, it is absurd to make it depend upon climate alone. Extreme cold, as well as extreme heat, by enfeebling the constitution, seems to check and restrain that progress in improvement which a people might otherwise make ; but institutions and manners struggle successfully against climate. Egypt, under the tropic, and Scandinavia, under the polar circle, have equally given birth to heroes, men of genius, and philosophers.

The nature of a country has more influence than the temperature. The mountainous central parts of Greece, formerly the beloved abodes of courage and independence, are still the places that are least accessible to despotism. In Thrace, the Sarri, inhabitants of the mountains, maintained for a long time their independence ;[f] in these same mountains, as well as in Macedonia, we find at this day hordes of Turcomans who live in the enjoyment of liberty.[g] The Illyrians bravely resisted the kings of Macedonia, and the Roman Legions.[h] The Arnauts, or Albanians wandering upon these same mountains, obey the Turks only when paid by them. The Greeks, in spite of the yoke of tyranny under which they are oppressed, exhibit still in some mountainous cantons, the manly character and republican spirit of their ancestors. Without mentioning the Mainotes, so often referred to, let us look to the town of Ambelakia,

[a] Herod. iv. 26.
[b] Strabo, xi. 353, edit. Casaub. Atreb. Herod. i. cap. 216
[c] Herod. iii. cap. 99, 100.
[d] Rubruquis, Marco Paolo, Mendana, &c.
[e] Strabo, iv. 139.
[f] Herodot. lib. vii. cap. iii.
[g] Felix Beaujour, vol. i. p. 325.
[h] Livy, i. 43. cap. 19. Justin, &c.

situated on the declivity of Mount Ossa, above Tempe; its inhabitants, as brave as they are industrious, have twice repulsed the Ottoman troops, and no Turk dare show himself on their rocks.[a] The small town of Parga, whose unhappy and unmerited catastrophe we shall afterwards have occasion to describe, has often presented the spectacle of women taking up arms and fighting for liberty.[b] The Spachiotes, who inhabit the white mountains in the Isle of Crete, have been only lately subjugated, rather by intestine discords than by the arms of the Turks. They still preserve several institutions of the ancient Cretans.[c] It is perhaps to the peculiar nature of the soil of Europe, to its being more intersected, more rugged, and more unproductive, than that of Asia or America, that we owe that presence of mind, and that spirit of bold enterprise and perseverance by which the natives are in general so much distinguished. These qualities eminently characterize the inhabitants of the Alps, the Dofrines, and the Cevennes.

Nations that occupy mountainous districts, especially when jealous of their liberty, and living in small separate states, speak generally a number of dialects, which, in process of time, become so many languages. In Caucasus, there were twenty-six different dialects spoken.[d] As a farther proof of this, we may also refer to the numerous dialects of Greece and Scandinavia.

Tribes that inhabit vast plains destitute of large rivers and forests, naturally betake themselves to a wandering life, and the tending of flocks and cattle. The patriarchal government, the parent of despotism, had its origin among wandering tribes or *Nomades*. An insulated mode of life retards the progress of population; and the facility with which food is procured, obstructs the growth of industry and the arts. Such is the cause of the barbarism in which the tribes of central Asia remain. But if these tribes meet with considerable rivers, bordered by meadows affording rich pasture to their herds, they follow their course,[e] and, descending into fertile valleys, become fishermen and agriculturists. As soon as they have fixed their abode, we see the arts and sciences gradually spring up in the midst of them. The Mongols descending from their upland plains, have become the founders of numerous towns in China; and an African horde, following the Nile from Meroe and Upper Ethiopia, has been able successively to create the wonders of Thebes and of Memphis.

Forests must have been the primitive abodes of the European tribes, when they lived upon acorns. Even now the palm forests afford shelter to the nations of Africa. The hunting of animals was the natural occupation of these people; but at the dawn of civilization, the tribes of hunters, having both the body and the mind formed by violent exercise, by dangers, and incessant toil, must have made more rapid progress in improvement than the pastoral tribes, and must have built houses and towns at a much earlier period. The forests would furnish them with the materials and the model of their architecture. Trunks of trees supporting a verdant roof, suggested the first idea of Grecian and Indian colonnades, whilst Chinese architecture consists only of tents imitated in wood and stone; and in the Gothic architecture, we recognise the image of gloomy caverns and steep rocks.[f g]

Mountains, rivers, and forests, having directed the first tribes in their emigrations, and having influenced their physical and moral character, have also given rise to the first geographical divisions and denominations,[h] as we shall often have occasion to show in our particular descriptions.

But what has most accelerated the extension of the human species, and the progress of civilization, is the invention of navigation.

What lively and strange emotions must the first men have felt, when, descending from their paternal mountains, after having wandered in the thick forests which covered them, they saw, all at once, their further advance impeded by an immense plain of water, which, in the distance, appeared to be lost in the sky, and to mingle with the clouds! The hunters, accustomed as they were to danger, would feel a great degree of repugnance to commit themselves to the waves. But no sooner was the first skiff launched upon the ocean, than the whole physical and moral state of that tribe, which, in consequence of its situation, was enabled to profit by this great discovery, would be changed. A small territory, abounding in fisheries, was enabled to accumulate a numerous population. Civilized islands became asylums inaccessible to the attacks of savages. These small corners of the earth, insulated by nature itself, gave rise to the first ideas of country and of national independence. Even the inclemency of the maritime air must have had some influence upon the progress of civilization. In the interior of the country, a tent or hut of verdant turf afforded a sufficient shelter from the rain and the wind. Near the sea, the dampness of the atmosphere rendered it necessary to build habitations of firmer materials and a closer construction. Great towns arose upon the banks of a river, or upon the shores of the sea.

The character of insular nations is always distinguished by originality. Attached to their native soil, and unjust towards a foreign one; faithful to national remembrances, but strongly biassed by superstitions and prejudices, they generally exhibit more energetic virtues and vices than the inhabitants of continental plains.

In the history of the human species, the progress of navigation will always hold the first place after that of agriculture. The civilization which agriculture gives rise to, is purely local; it stops as soon as the supply of the wants of the nation is secured; agricultural societies, generally composed of only two classes, masters and slaves, insulate themselves from the rest of the world more by their laws and customs, than by the lofty walls they have sometimes raised to defend themselves against foreign aggression. But navigation disturbs this Chinese felicity, and interrupts a repose so opposed to the destinies of human nature. A vessel unites the most

[a] F. Beaujour, vol. i. p. 272.
[b] Scrofani, Voyage en Grèce, vol. iii. p. 21.
[c] Savary, Lettres sur la Greece. Lett. xxxvi.
[d] Strabo, xi. Reineggs, Voyage, &c.
[e] Compare Deguignes, Histoire des Huns, ii. p. 5.

[f] Hodge's Travels in India, part. i.
[g] Gothic architecture has been supposed, by some, to have been originally an imitation of constructions in wicker work and wattles.—P.
[h] Rudbeck, Atlant. i. 55—57. Eccard, Orig. German, p. 86. Torfæi, Hist. Norweg. i. 130—150.

distant regions of the world; cities, nay even whole nations, are transported to other climates; the tumult and the hum of civilization is heard among indolent savages; an universal movement pervades all classes; and man is unconsciously drawn on to the conquest of the globe.

The fate of the great human families has been decided by the direction which they took in their emigration, by the nature of the soil which they occupied, but, above all, by the positions of the great seas of the globe, and the advantages which men were able to derive from them. Is not the perpetual infancy of the Chinese chiefly owing to their ignorance of the art of navigation?[a] On the contrary, if the Japanese and the Malays exhibit a character, manly, enterprising, and different from that of the other Asiatics, it was formed at the epoch when their squadrons traversed the great Eastern Ocean, which is at present filled with their colonies. The people of Africa are, as it were, buried in the midst of a great continent, destitute of gulfs and arms of the sea. This circumstance, by hindering navigation from carrying industry thither, has powerfully contributed to brutify the nations of that continent. The Europeans alone were called by Providence to extend their empire over the globe. The nations who have peopled Europe had to cross the mountains of Caucasus and the Alps, the Black Sea, the Baltic, the Archipelago, the Adriatic, and the Mediterranean. Obstacles so formidable, retarded them at first in their progress; but, at the same time, they served to develope and to fortify that character of activity and courage which is common to the European nations. The descendants of Canaan, the Phenicians, soon lost the empire of the sea; Athens rivalled Tyre; a Grecian city ruled over conquered Egypt; Carthage submitted to Rome; Europe seized the sceptre of the world. At this first epoch, all civilization was collected around the Mediterranean; it was almost the only sea upon which there was any navigation. A second epoch commenced, and the march of civilization was still intimately connected with the progress of navigation. The compass and Columbus appeared. A new world saw our vessels land on its shores. A new Europe has arisen, and continues to advance with giant steps in the career of improvement. The Atlantic Ocean has become what the Mediterranean was before, the great highway and thorough fare of civilized nations.

But the march of civilization is far from being terminated; the wonders we have witnessed may still be surpassed. The Europeans have not confined themselves to the shores of that Atlantic ocean which, immense as it appeared to the Phenician and the Greek navigators, is only an arm of the sea, compared to that great ocean which, under the names of the Indian, the Pacific, and the Eastern, extends from pole to pole. The American navigators have already crossed the whole of this aquatic hemisphere—already British colonists have begun to settle the innumerable islands which form, to the south-east of Asia, a fifth part of the world; and Australasia, the most delightful country of the globe, will probably, ere many ages pass away, have reached the highest pinnacle of civilization. Let another Cadmus carry thither that torch of science which enlightens Europe! Let colonists, fraught with our learning, found a new Greece in Otaheite, or the Pelew Islands, then those rising grounds which now produce only aromatic herbs, will be covered with towns and palaces; bays now shaded by a forest of palms, will display a forest of masts; gold and marble will be extracted from the bowels of mountains as yet untouched by the miner; coral and pearls will be dragged from the bottom of the sea to adorn new capitols; and one day, perhaps, Europe, Asia, Africa, and America, will find dangerous and successful rivals in countries, whose existence, at this moment, scarcely occupies their attention.

Thus, in the history of the human race, the past, the present, and the future, are connected with the position of the great seas of the globe, and with the progress of navigation.

[a] The Chinese have long been the principal navigators in the Eastern seas. They were acquainted with the magnetic needle before they were visited by Europeans.—P.

BOOK XXIV.

GENERAL DESCRIPTION OF ASIA.

It was in Asia, according to the most authentic accounts, that arts and civilization had their origin; and it is with this division of the globe that we shall begin our series of descriptions, which will in some measure resemble a voyage round the world.

There is no evidence to prove that the ancient nations of Asia recognised those grand divisions of the globe to which we have given the name of quarters, or that they distinguished the division in which they lived by the name of Asia. The conjecture of the learned Bochart, who derives this name from a Hebrew or Phenician word,[a] signifying *the middle*, has therefore no foundation in history. Equally little confidence is due to the speculations of some etymologists, upon an obscure relation of the name Asia to the word *As*, a general term for a divinity among many European nations.[b] To confine ourselves, then, to admitted facts, the name of Asia was applied by Homer, Herodotus, and Euripides,[c] to a district of Lydia watered by the Caÿster, and in which the geographers of a later age distinguished a tribe called Asiones, and a city called Asia. It appears probable, that the Greeks, in proportion as their knowledge was enlarged, extended this name by little and little, from the district to which it was first applied, till it embraced the whole of Asia Minor, and ultimately the other extensive regions of the east. It was thus that the French extended the name of the duchy of Allemagne to the whole of Germany; and that the ancient canton of Italia, in a remote corner of Calabria, imposed its name on the great peninsula of which it formed so inconsiderable a portion.

The limits of Asia are partly natural and permanent, and partly defined by arrangements which admit of difference of opinion. On the south-west, the straits of Babelmandel and the Arabian gulf separate it from Africa, with which it unites at the isthmus of Suez. Towards the west, the Mediterranean Sea, the Archipelago, the straits of the Dardanelles and of Constantinople, the Black Sea, and the straits of Caffa, divide it from Europe; but from the straits of Caffa to those of Waigatz, near Nova Zembla, the boundary is uncertain. The opinion most generally followed, is that of most of the ancients, who regarded the Tanais, now the Don, as the natural limit of these two divisions of the world; but the tortuous course of this river, of which the ancients had very vague ideas, has led geographers into a labyrinth of contradictions;[d] by some, a line is traced from the mouth of the Don to that of the Dwina, in the White Sea; by others to the mouth of the Obi; but both methods are entirely arbitrary. The academicians of St. Petersburgh, however, have at last satisfactorily shown, that the chain of the Uralian mountains constitutes the natural boundary of Europe and Northern Asia. To reconcile this limit, now generally adopted, with the ancient claims of the Tanais, Pallas has proposed to trace a line of demarcation, following the exterior margin of those vast salt plains which bound the Caspian Sea on the north, leaving in Asia the Russian governments of Orenbourg and Astracan, crossing the Wolga at Zarizin, and thence following the course of the Don.[e] This arrangement of Pallas has the disadvantage of dividing the course of a large river into two parts, belonging to separate quarters of the world, and of being founded on circumstances which, though natural, are not marked with sufficient distinctness for the purposes of geography. It is better to follow the opinion of Herodotus, Plato, Erastosthenes, and other ancients, and abandon almost entirely the course of the Don, and fix the frontier of Asia, by the line which most naturally terminates the isthmus of Caucasus. This line is marked by the course of the rivers Manitch and Kooma. It is by the beds of these two water-courses that the Palus Meotis and the Caspian Sea would mix their waters, if their level were about 220 feet higher. The Manitch falls into the Don, which thus preserves for some leagues its ancient prerogative of separating Europe from Asia. Upon mature reflection, we prefer this boundary to that which follows the course of the Kooban and the Terek. From the mouth of the Kooma, the Caspian Sea will mark out the frontier of Europe to the mouth of the great river Jaik, to which Catherine II. gave the more geographical name of Ural. This river, in conducting us to the mountains of the same name, will complete the natural limits towards the west.

From the straits of Waigatz, the Frozen Sea forms the boundary of Asia. It is uncertain whether the lands discovered to the north of Siberia are islands, like Nova Zembla, or the extremities of West Greenland. Whether the Frozen Sea itself is wide enough to be called a sea, or is only a long channel confined by lands and islands, it is at least certain, that it bounds northern Asia on all sides, and that this part of the world is also completely separated from North America by Behring's Straits. Commencing by these straits, the Great or the Pacific Ocean forms the eastern limit of Asia. The Aleutian Islands, and those which are in their vicinity, thus belong to America, being only a prolongation of the peninsula of Alashka.

But what frontier can be assigned to Asia towards the south-east? Must we say, that the Marian or Ladrone islands, the Philippines, the Moluccas, Celebes, Borneo, and Java, make part of Asia, whilst New Guinea and New Britain do not belong to it? All natural limits cease as soon as we enter that immense archipelago which extends between the great ocean and the Indian seas. Yet we cannot avoid considering the straits of Malacca, and the passage between the Philippine islands and Formosa, as the most natural frontier of Asia on this side.

[a] Bochart. Phaleg. IV. c. 33.
[b] Comp. Bayer, Comment. Petropolit. V. 334.
[c] Eurip. Bacchæ, v. 64. Hist. Geog. p. 40.
[d] See the maps of Sanson, Delisle, Homann, &c.
[e] Commentarii Petropol. 1. Plan of a Description of Russia. Pallas, Observ. sur les montagnes, etc.

ASIA.
ARCTIC OCEAN
NORTH PACIFIC OCEAN
INDIAN OCEAN
EUROPE
SIBERIA
TARTARY
CHINESE TARTARY
CHINA
HINDOOSTAN
PERSIA
ARABIA
AFRICA
NEW HOLLAND
NEW GUINEA
JAPAN
BORNEO
Tropic of Cancer
EQUATOR
Boston, Published by Samuel Walker.

All the islands to the east of this line, as far as New Zealand and the Society Islands, should evidently form a fifth division of the world, of which New Holland is the continent or principal land. A glance at a modern chart of the South Sea will be sufficient to convince every well informed person of the advantages which will arise from the adoption of this arrangement in the methodical distribution of geographical descriptions.[a]

To the south, the Indian ocean separates Asia from Africa; so that the Maldive islands belong to Asia; the Isle of France, Bourbon, and Mahé to Africa, though, in the idiom of commerce and navigation, these last islands are sometimes spoken of as if they belonged to the East Indies. The island of Socotora, which incontestibly belongs to Africa, is, however, in a great many works, described as in Asia.[b]

Circumscribed within the boundaries now pointed out, Asia presents a surface that may be estimated at 154,000,000 English square miles.[c] The greatest length of this continent, taken obliquely from the isthmus of Suez to Behring's Straits, is about 7370 English miles;[d] taken under the 30th parallel, from Suez to Nanking, its length is less than 6000 miles;[e] under the 40th parallel, from the Dardanelles to Corea, it is 6000 miles;[f] and under the polar circle 3528 miles;[g] the breadth from north to south, from Cape Comorin in India, to Cape Taimura in Siberia, about 4230 miles.[h] We find the principal mass of the continent of Asia situated in the northern temperate zone. That part which belongs to the torrid zone is about one-seventh of the whole. Only one-seventeenth lies within the polar circle; but other physical circumstances extend the influence of the polar cold over nearly one-half of this continent. In order to form a correct idea of the great contrast of temperature which prevails in Asia, we must first make some observations on the five great physical regions, or zones, into which nature has divided that part of the world.

Our attention is first called to that immense plateau, or elevated plain, which rises between the 30th and 50th parallels, and which extends from the Caspian Sea to the Lake of Baikal, and from the sources of the Indus to the wall of China. It is known by the incorrect name of the plateau of Tartary; but may be more properly called Central Asia. It is an assemblage of naked mountains, enormous rocks, and very elevated plains: in these high regions two masses of mountains shoot up, and form the nucleus of all the great chains which traverse Asia. The one is formed by the mountains of Thibet, in whose high valleys eternal snows are found, though within thirty degrees of the equator; they probably have an elevation of more than 20,000 feet.[i] It is from hence that the chains of mountains proceed which, under the names of Kentaisse, Himalaya, and others, extend towards Hindostan, and in that peninsula join the chain of mountains called Ghauts, which terminates at Cape Comorin. The Mustag, which is the Mount *Imaus* of the ancients, extends on one side into Tartary, and is connected by the mountains of Persia with Mount Ararat, Mount Taurus, and Caucasus, the nuclei of western Asia. On the other side, numerous chains descend into the peninsula beyond the Ganges, which they divide into long parallel valleys; one of them prolongs itself into the peninsula of Malacca, and then appears to pass into that immense archipelago, which we consider as a fifth division of the world. Mountains as high, but nearer to each other, fill the northern and western provinces of China, and terminate in rapid declivities. To the north of these chains of mountains, there is an elevated plain, perhaps the highest region of the globe.—It is the vast desert of Kobi or Shamo. Here we find only salt lakes and small rivers, which are lost in a mass of sand and gravel; some few tracts of pasture, or stinted shrubs are the only signs of vegetation. The length of this plateau, from the source of the Indus and the Ganges, to beyond that of the Amur or Seghalien, comprises from twenty-three to twenty-four degrees of longitude, and a breadth varying from three to ten degrees of latitude. The plateau is terminated to the north by another mass of mountains, whose highest summit, according to Pallas, is named Bogdo. From thence, as from a common centre, branch out four chains of mountains, two considerably larger than the others. That which goes to the south, under the name of Mossart, appears only a sort of girdle connecting the plateau of Mongol Tartary with that of Thibet; a similar secondary branch, under the name of Alak, bends to the west, traverses Independent Tartary, particularly Bucharia, and approaches the Uralian Mountains towards lake Aral; whilst on the other side it is connected with the Beloor Mountains, which separate the two Bucharias, and which unite with the mountains of eastern Persia and the north of India. Thus, towards the west the two principal masses are connected in every direction; and we may consider them as two summits of one and the same plateau. But let us return to the great branches of the Bogdo, one of which extends towards the east, under the name of Kangai, occupies Mongol and Chinese Tartary, and terminates towards the seas of Corea and Japan. It is rather a long plateau than a chain properly so called. Another branch, the *Altai*, is prolonged into Eastern Siberia. This is interrupted by deep defiles through which the rivers Obi and Yenisei descend towards the plains of Siberia. A similar branch forms, to the east of Lake Baikal, the mountains of Dauria, or of Nertchinsk, which extend towards Kamtchatka and Behring's Straits.

Such is the great Asiatic chain; it is the most extensive system of mountains that has hitherto been discovered on the globe. Perhaps the Cordilleras alone rival it in elevation; while the central mountains of Africa may equal it in extent. The numerous and

[a] There was in one respect an obvious propriety in extending the limits of Asia to all the islands W. and N. W. of New Guinea and New Holland. They had all been more or less under the influence of Asiatic civilization; whereas in the islands farther east the natives were either entirely savage, or but little raised above that state, and in no instance had they adopted the civilization of S. and E. Asia.—P.

[b] Perhaps it would be still better to restrict the names of the great divisions to continents, and to take the islands in arbitrary groupes, or speak of them as belonging to the respective divisions when they lie contiguous, without attaching any permanent importance to this part of geographical nomenclature.—Tr.

[c] "3,960,000 to 4,000,000 square myriamètres."

[d] "1185 myriamètres."

[e] "960 myriamètres."

[f] "965 myriamètres."

[g] "569 myriamètres."

[h] "682 myriamètres."

[i] 26,000 or 27,000?—P.

great rivers which issue from the central plateau of Asia on all sides, the sterility of the soil, and the intensity of the cold which exists there in all seasons, even in the plains and valleys, are better evidences of its immense height than the vague mensuration of Mr. Crawford.

Two great regions of Asia are attached to the central plateau on the northern and southern sides. Southern Asia, or India, is protected from the cold blasts of the north by the mountains of Thibet, and declines greatly towards the equator. Watered by numerous and large rivers, its rich soil always receives the heat of the sun, and is impregnated with the exhalations of a sea which the winter never influences. What a contrast between those fertile countries and the gloomy solitudes of Northern Asia, that vast Siberia, which extends towards the pole and the frozen sea, and never feels the soft breezes of the tropic, nor the modifying gales which come from a fluid ocean.

Nature has bestowed on each of these regions, a physical character which human industry can never change, or even modify in any sensible degree. As long as the present equilibrium of the globe lasts, the ice will always be collected at the mouths of the Obi and the Lena; the winds will always blow in the deserts of Shamo; and Thibet will never see the snows of its Alps disappear before the rays of the sun, which at no great distance, scorch the tropical regions. On this account, the Tartar as naturally pursues an agricultural and pastoral life as the Siberian that of a hunter. The Indian, in appearance, and perhaps in appearance only, more happy, owes in a great measure to his climate that effeminacy and indolence which brings upon him the scourge of domestic tyranny and the ravages of foreign adventurers.

Two great regions now remain to be considered, those of Eastern and Western Asia. The first, which is insensibly confounded with the central plateau, presents three distinct divisions. A large chain of mountains covered in part with eternal snow, extends from the plateau of Mongol Tartary to Corea; to the north of these mountains, the Amur flows at first towards the south-east, but very soon towards the north-east, where the land is very elevated, and the exposure the coldest in the northern temperate zone. Those countries generally known under the name of Chinese Tartary, resemble Northern Asia, although they are situated under the latitudes of France. The mass of cold which, if we may so express it, overhangs Tartary, and on the other side, the uniform temperature of the Great Ocean, joined to an aspect directly east, give to China Proper a colder climate than that of southern Asia. This vast country, although it just passes the tropic, and scarcely extends beyond the 40th degree of northern latitude, comprehends every European climate.

The third part of the eastern region of Asia, is formed by that prodigious chain of islands, and volcanic peninsulas, which rises at a little distance from the continent, and presents as it were, an immense barrier, to the fury of the ocean. This maritime region, though almost sourrounded by the ocean, cannot be considered separate from the continent of Asia. It possesses all the variety of temperature to which its peculiar situation exposes it.

The fifth grand region of Asia is more detached from the mass of the continent than any of the others. The Caspian sea, the Black sea, the Mediterranean and the Persian and Arabian gulfs, give to Western Asia some resemblance to a great peninsula. We may with some degree of truth assert that this region is as much opposed to the eastern region, as that of the south is to the north. Eastern Asia is in general damp, Western Asia is a dry, and in some places quite an arid region; the one has a stormy, and very often a cloudy sky, the other enjoys constant breezes, and a great serenity of atmosphere; the one has chains of steep mountains separated by marshy plains, the other is composed of plateaus, in a great measure sandy, and very little inferior in elevation to the mountains which rise out of them. In eastern Asia, we see very long rivers running near each other, whilst, in western Asia, there are only two or three of any considerable size; but, as a sort of compensation, there are numerous lakes without any outlet. Lastly, the proximity of the immense burning sands of Africa communicates to a great part of western Asia a temperature much warmer than that which even southern Asia enjoys.

In order to give greater precision to these general sketches of the physical regions of Asia, it will be proper to class the rivers of this continent according to the basins or seas into which they respectively flow, which we have done in the following table, in which the length of the course of each river is also pointed out. Those rivers which are printed in an inner line are such as flow into that which precedes.

Basin of the Frozen Sea; Northern Declivity of the Plateau of Mongol Tartary.

	Length of their Courses. Myriametres.	English Miles
Obi	347	2151
Irtysh	210	1302
Tobol	80	496
Yenisseï	340	2108
Tunguska *upper*	132	818
Tunguska *lower*	137	849
Piasiga	41	254
Khatonga	48	297
Olenek	75	465
Lena	334	2071
Vilui	100	620
Aldan	125	775
Jana	49	304
Indighirka	108	669
Kovyma	120	744

Northern Basin of the Great Ocean; Eastern Declivity of Siberia, and of the Plateau of Mongol Tartary

	Length of their Courses. Myriametres.	English Miles.
Anadyr	70	434
Kamtchatka	40	248
Amur or Seghalien (including the Szilka)	294	1823
Songari-Ula	100	620

Basin of the Sea of China, making a part of the Basin of the Great Ocean; Eastern Declivity of the Plateau of Thibet.

	Length of their Courses. Myriametres.	English miles.
Hoang-Ho (the Yellow River)	320	1984
Yang-Tse-Kiang, (the Blue River)	368	2281
Hon-Kian	120	744

Southern Declivity of the Plateau of Thibet.

(a) *Basin of the Sea of China, and of the Gulf of Siam.*

	Length of their Courses. Myriametres.	English Miles.
Me-Kong, or Cambodja	300?	1860
Me-Nan	250?	1550

(b) *Basin of the Indian Ocean.*

	Myriametres.	English Miles.
Irabaddy or river of Pegu	290?	1798
Ken-Duen	150?	930
Tsampo or Booramputer	200	1240
Ganges	250	1550
Godaveri	90	558
Kistna	86	533
Nerbudda	81	502
Indus or Sinda	195?	1209

Declivities and Basins of the Interior of Asia.

a) *Basin of Lake Aral: Western declivity of the great central plateau.*

	Length of Course. Myriametres.	English Miles.
Syr Daria	110	682
Amu Daria or Gihon	145	899

(b) *In Little Bucharia, towards the desert of Kobi.*

	Length of Course. Myriametres.	English Miles.
Yerkend or Mehescha	100	620

(c) *Basin of the Lake of Baikal.*

	Myriametres.	English Miles.
Selinga	76	471

Declivities of Western Asia, or of Caucasus—of Ararat—of Taurus, &c.

(a) *Towards the Caspian Sea.*

	Length of their Courses. Myriametres.	English Miles.
Kur or Cyrus	46	285
Araxes	42	260

(b) *Towards the Persian Gulf.*

	Myriametres.	English Miles.
Euphrates (to the gulf)	185	1147
Tigris	100	620

(c) *Towards the Arabian Gulf, or Red Sea.*

No river, and few rivulets.

(d) *Towards the Mediterranean and Archipelago.*

	Myriametres.	English Miles
Orontes	28	173
Meander	40	248

(e) *Towards the Black Sea.*

	Myriametres.	English Miles.
Sangarius (Sakaria)	40	248
Halys (Kisil-Irmak)	54	335
Phasis or Rione	21	130

In giving an account of all the rivers laid down in the maps of Asia, we have formed the following estimate of the proportional volumes, or, to speak more exactly, of the surfaces of the running waters of that part of the world.

The total taken as unity	1.00
The rivers of Siberia flowing to the north	0.31
The rivers of Siberia to the east	0.02
of China and Chinese Tartary	0.15
of all India	0.27
of the centre of Asia	0.08
of Turkey in Asia	0.10
of Persia (with Armenia)	0.06
of Arabia	0.03

In order to form a conclusion from these data, in regard to the dryness of one country compared with another, we must consider their respective surfaces. Arabia, for example, is certainly much drier than Persia or Turkey, but India and China are not less copiously watered than Siberia. It is the smaller extent of surface which causes the difference in the volume of waters.

The continent of Asia, forming a considerable body of land, and but little intersected by seas, ought naturally to contain in its interior great accumulations of water. It contains, in fact, the largest lake known, viz. the Caspian Sea. In general, the lakes of Asia are distinguished by the saline, brackish, or sulphureous nature of their water: many of them have no outlet. Asia Minor affords us in this respect a sample of the great continent, of which it makes a part. The interior of Anatolia and Caramania contains a series of salt lakes without any outlet; that of Tazla is of very considerable length. Ascending to the most elevated parts of Western Asia, we see the lakes of Van and Urmia, whose brackish waters extend over an immense space. In Syria, several lakes of this nature succeed each other along the chain of Libanus and Anti-Libanus. The most celebrated is the lake Asphaltites, or the Dead Sea, in Palestine, the waters of which are bituminous, and cover from 450 to 500 square miles.[a]

All the lakes of Arabia are formed by the confluence of rain waters and springs, which are lost or absorbed in the sand. But these waters are of very limited extent. The deserts of Persia, similar in other respects to those of Arabia, present the same description of lakes, but larger. That of Zeré[b] covers an extent of 1074 square miles,[c] and receives a river whose course is 400 miles long,[d] besides several small ones.

The western declivity of the plateau of Tartary is

[a] "12 to 15 square myriamètres."
[b] Durrah.
[c] "140 square French leagues."
[d] "150 French leagues or 66 myriamètres."

covered with salt lakes, without any outlet. The Caspian Sea covers an extent of 120,000 square miles.[a] It is the largest salt lake known. The lake, or Sea of Aral, contains 9600 square miles.[b] The Salt Lake, between the Aral and the Caspian Sea, those of Aksakol and Telegul, that of Balkashi, or Palcati, and a number of smaller lakes, either salt or brackish, distinguish this region, which declines by successive terraces from the centre of Asia towards the Caspian Sea, and which is opposite to another region entirely covered with plains, inclining from the centre of European Russia towards the same sea. These two basins appear to be both impregnated with salt. It has been concluded from thence, that the Caspian Sea formerly covered all these countries. This is possible with respect to the plains of Astracan, which are not much elevated above it. But it is not probable with respect to the countries situated to the east and north-east of that sea; for the land rises considerably even between lake Aral and the Caspian, and still more between the former and the other salt lakes. Besides, there are some of these salt lakes far beyond the limits which the Caspian Sea in its greatest extent could have reached. The northern declivity of the plateau of Tartary contains many such lakes, such as the Ebelain, the Jamysh, the Karazuzkie, and others. The lake *Czany*, which has no outlet, is also brackish, which is indeed the case with all stagnant waters on a soil impregnated with saline substances. These masses of stagnant water are also found at a much more elevated level upon the vast plateaus of Mongol Tartary and Thibet. The high plains, surrounded by mountains, which form the country of the Calmucks, inclose a great many lakes without any outlet, which are fed by small streams or rivers. The Kirkir-nor, a lake which is found beyond the mountains, from whence the Irtysh and the Obi rise, receives a river whose course is from 70 to 80 leagues. The elevated plain between the mountains of Mongolia and those of Thibet, the two summits of Asia, is filled with very considerable rivers, which disappear in the sand, or feed lakes which have no outlet. Such is the Yerkend, which runs into the lake of Lop.

Thibet, or the southern and most elevated plateau of Asia, is singularly rich in lakes, a great number of which have no outlet. The Terkiri contains 2300 square miles.[c] If we draw lines from Terkiri, one to the north of 220 miles,[d] the other to the west of 470 miles,[e] we shall find 23 other lakes, which have no outlet, or which flow one into the other. We remark among others, to the north-east of Thibet, the Hoho-nor, or Koko-nor, of 1840 square miles,[f] in a very elevated situation, which has no outlet.

Lakes without outlets are therefore common to all the western and central parts of Asia, but not to the north of Siberia, nor to China, or India. The low parts of Siberia are covered with immense marshes, almost contiguous to each other. The large lakes of China are found in the low and marshy countries in the centre, and, in a geographical point of view, are only remarkable from their contiguity. They seem to confirm the tradition of the Chinese, that a part of their country has been recently left by the sea, or rather by two long gulfs formed by the rivers Hoang-ho and Yang-tse-kiang. The two peninsulas of India have no remarkable lakes, nor any without outlets. This is a proof that the land throughout has a continued declivity.

From this view of the hydrography of Asia it appears that this continent is entirely different from America, and contains but very few of those low plains which the ocean would cover, if it rose much above its present level. Asia presents, without doubt, some plains of this kind, particularly an immense one along the frozen sea, a much smaller one in China, one at the mouths of the Ganges, the Tehama in Arabia, Mesopotamia, the plain of the Meander, and some others; but the immense majority of the plains of Asia are more like vast platforms on the tops of mountains. Sometimes they rise in successive terraces, sustaining other mountains with their valleys; sometimes they are of vast extent, preserving the same level, though slightly interrupted by local declivities. Hence the lakes without an outlet, and the rivers which rise and disappear in the same desert; hence also those sudden changes from intense cold to insupportable heat, which we find on descending from Thibet into India, or from the interior of Persia towards the coasts. The sudden change of the level produces this effect, although the latitude may not have sensibly varied. The change of temperature which we feel in going from Switzerland into Lombardy gives us a faint idea of it. It is to the same conformation of the country that we must attribute those periodical and constant winds which blow even in the interior of Asia. I do not allude to the monsoons of India, which depend on the annual motion of the sun, but to that long duration of the same wind which we observe in countries at a distance from the tropics. This effect is probably owing to the absence of gulfs and seas, whose exhalations and currents might alter the nature of the wind, or change its direction. The chilling winds of Siberia ascend even to the summits of the centre; and if sufficiently elevated to pass the first chains, they may extend to the heights of Thibet. The wind from the east, charged with fogs, covers at once all the lower parts of China; but as we get farther into the temperate zone, all regularity in the united action of the sea and the atmosphere gradually cease. Thus, at Japan, cold and heat, storms and calms, succeed each other almost as rapidly as in Great Britain. China is liable to those less sensible variations which Holland experiences, either from the humidity of the sea breezes, or the dryness of those which have passed over the land. In short, if we penetrate the temperate oriental countries, the seasons always become more constant, but colder, in proportion as we approach the centre. Nearly the same changes are perceptible in going from the west to the east of Europe.

In northern Asia, there is another feature which strikes us as very remarkable, in comparing that region with the parts of Europe situated under the same latitudes. The cold of northern Asia always increases as

[a] "16,850 sq. Fr. leagues, or 3139 sq. myriamètres."
[b] "1280 sq. Fr. leagues."
[c] "300 sq. Fr. leagues."
[d] "80 Fr. leagues."
[e] "160 to 170 Fr. leagues."
[f] "240 sq. Fr. leagues."

we proceed towards the east. This augmentation is so great, that, upon the coasts of Tartary, situated under the same latitudes as France, the winter commences in the month of September. Several causes combine, without doubt, to produce this phenomenon. In the first place, there rise between Corea and the countries upon the river Amoor, vast mountains covered with glaciers; a second, and still greater mass of mountains separates the Amoor from the Lena: all the coasts of the north-east are also extremely steep; and, we may add, that the seas which surround these frozen countries are almost always covered with thick and cold fogs, which intercept the rays of the sun. A third cause may be found in the absolute want of inhabitants, and consequently of cultivation. In eastern Siberia, according to the official reports, there is scarcely one individual to seven square miles.[a] Nevertheless, these causes would not, perhaps, be sufficient, if we could not apply a general rule which we have pointed out in treating of the theory of climates.[b] We must consider the mass of air superincumbent on a continent as a whole, the general modification of which depends on all the partial modifications. If a continent extend far into the torrid zone, the mass of warm air re-acts upon the temperate mass, and communicates to it a part of its caloric, and, by dilating, forces it towards the north, and thus confines the limits of the cold. So that the countries toward the poles do not simply become cold, in the direct ratio of their latitudes. This increase of cold also observes an inverse ratio to the extent of heated land contiguous to them on the south. Such is the reason why the neighbourhood of the immense mass of heated surface in Africa renders the temperature of Arabia, of Syria, and of Mesopotamia, hotter than it should otherwise be. In the winter season, the cold of North America is very piercing in the environs of the tropic; for the part of that continent which extends to the south of the tropic of Cancer, is nothing in comparison with the remainder. Hence, there is no mass of warm air to re-act on the temperate and cold, so that the action of the cold mass receives no counterbalance. If we examine the map of Asia, we shall see the form of that continent contracting in breadth from China to Behring's Straits, in which meridian no part of it is warm. The air in these countries, naturally cold, is rendered still more so by the influence of the frozen sea: the great Pacific Ocean is not adequate to counterbalance its effects, being itself cooled by a great number of ice-bergs which enter it through Behring's Straits. These ice-bergs are stopped between the Aleutian Islands and those of Andrinow, and occasion the cold fogs with which this part of the sea is covered. They are also carried by the general current of the ocean from east to west, that is, from America to Asia, where they accumulate in the gulfs.

This unchangeableness of physical circumstances—these climates which no industry can sensibly ameliorate—these regular returns of the seasons—that constant repetition of the same mode of cultivation, and consequently of the same mode of living, must have an influence on the moral character of the Asiatics, as well in uniformly modifying their nervous and muscular system, as in exciting their imagination by the return of the same sensations. It contributes to render the wandering Tartar as invariable in his inclination for pastoral life as the Indian is in his servile indolence, and the Chinese in his indefatigable industry. Still we must not attribute to that cause alone the immutability of character which we observe among the Asiatic nations. Hippocrates, who had but a partial view of the physical facts, is cautious of attributing to them an exclusive influence.

"If the people of Asia,"[c] says he, "are without courage, without energy, of a milder and less warlike character than the Europeans, it is in a great measure owing to the equality of the climate. The difference of heat and cold is not known there, the two temperatures unite one with another. The mind does not feel those sudden shocks, nor the body those quick changes, which give vigour, and even impetuosity to the character. "But," adds he, "another reason of the inactivity of the Asiatics is the nature of their political laws; they are for the most part governed by absolute monarchs, and whenever a man is not master of his own person, and does not participate in the legislative power, but is subjected to the sway of despots, he does not wish to pass for a brave man, because he knows that it would expose him to greater dangers. The subjects are obliged to go to war, to support all the inconveniences of it, and to shed their blood even far from their children, wives, and friends. All their exploits only tend to augment the power of their despots; dangers and death are the only rewards they obtain for their bravery. Besides which, they are compelled to see their property converted into deserts, either by the devastation of war, or the want of cultivation, so that, if there are found among them some courageous minds, they are prevented from the use of their energies by the nature of their political institutions. A proof of what I advance is, that those among the Asiatics who enjoy some political liberty, and who consequently labour for themselves, are comparatively warlike."

If Hippocrates thought himself obliged to make some exception in regard to the few Asiatic countries and nations that were known in his time, and among whom, the Sarmates, in the plains to the north of Caucasus, were the most northerly, as the Indians of the Pendjab were the most easterly, what would he do now, when our geographical knowledge is so much more extensive? It would require all the enthusiasm of a physician or of a Hellenist, ignorant of the state of physical geography, to believe that Hippocrates had foretold the moral influence of the climate of Siberia, of Thibet, or China, of the very existence of which he was totally ignorant. How could Hippocrates have asserted, that the innumerable tribes of Tartars and Mongols, were less warlike than the Europeans? In fact, the countries which this great writer includes under the name of Asia differ almost entirely from those which now form that part of the world; he comprises in Europe the *Sarmates*, although they dwelt beyond the Tanais;[d] he expressly

[a] "A square Fr. league."
[b] Vol. I. p. 145.
[c] Hippoc. de Aerib. aquis, et locis, § 85—88, edition of M. Coray
[d] Ibid. § 89.

places the *Egyptians* and *Lybians* in Asia.[a] It is then evident, that he understands by *Asia*, the southern and eastern parts of the world then known, and applies the name of Europe to the other half, *i. e.* the western and northern. Hippocrates, like Homer and many other ancients, distinguishes only *two* parts of the world; and he opposes the one as constantly to the other, as heat to cold, or dryness to moisture. Considering the matter in this point of view, we understand Hippocrates without difficulty, and we see the meaning of his assertion, that Asia in general enjoys a milder climate than Europe, and that all its productions are finer and larger.[b] We at once also perceive how vague and arbitrary the applications must have been which physiologists have made of a work of which they misconceived the most essential principles. We must not, therefore, assert that the Asiatics, without discrimination, are an effeminate and voluptuous people; but that such is the character of some nations of southern Asia; and from that number we must exclude the wandering Arab, the frugal Drusian, the energetic Birman, the ferocious Malay, and the unsubdued tribes of Mahrattas.

We shall allow, however, that the people of Asia owe to geographical circumstances some political and moral features very different from those which exist in Europe. A wandering and patriarchal life is clearly pointed out by nature to many Asiatic nations. The unlimited power of the father of a family becomes necessarily a pattern for monarchical authority. The want of great towns peopled by an industrious class of citizens prevents these nations from possessing any idea of a social compact or political liberty. In some other parts of Asia, the uniform fertility of the soil, and the constant mildness of the climate, in recompensing too rapidly the most trifling labour, have stifled almost in its birth the energy of the human mind, which requires to be stimulated by want and obstacles. Both these modes of living are productive of a mental and bodily inactivity, which becomes hereditary, and appears to stamp the Asiatic race with a general inferiority in energy and courage. This mental torpor subsisting in combination with some virtuous, mild, and hospitable feelings, keeps alive also the empire of religious superstition, under the yoke of which we find all the eastern and central parts of Asia languishing; whilst the Christianity of the Greek church slowly penetrates by the north, and Mahometanism still flourishes in the western regions. Polygamy, supported by the same spirit of routine throughout Asia, with the single exception of Japan, debases family connexions, and deprives life of its endearments, by taking from the female all consideration and influence; at the same time, being adverse to the laws of nature,[c] it diminishes population, and deteriorates the human race.

This immobility of character is not a phenomenon peculiar to Asia. Whenever nature is more powerful than industry, whether for good or for bad, man receives from the climate an invariable and irresistible impulse. Have the shepherd of the Alps, the fisherman of the Archipelago, the wandering Laplander, and the cultivator of Sicily, change their character? The only difference is that in Asia, where the nations are exhibited on a larger scale, the phenomena of civilization and barbarism strike us with greater force.

The very same circumstance assists in explaining why great and extensive empires are more common in Asia than in Europe. It is not enough to say that the great plains with which Asia abounds, give the conquerors an easier access. This only holds good in the central parts; but how many inaccessible mountains, how many large rivers, and immense deserts form the natural bulwarks, and eternal barriers of other Asiatic nations! When once an Asiatic nation profits by its local circumstances, it is as difficult to be conquered as any European people. The Druses, the Kurds, and the Mahrattas, are not the only examples; we can quote one still more illustrious. The chain of mountains of Assyria to the north-east of Babylon, which Alexander had no difficulty in passing, became a bulwark for the empire of the Parthians, before which the legions of Trajan himself were routed. The great conquests in Asia have arisen from another cause, and that is, the great extension of the same nations. The capitals of Hindostan, of China, or of Persia being given up to a conqueror, the immense multitude of tribes connected by speaking the same language, mechanically submit to the same yoke. These great empires once established, their succession becomes almost perpetual, from reasons purely moral and political. The nations of Asia, too numerous and too disseminated, do not feel the ardour and energy of true patriotism; they furnish their chiefs with troops, but without zeal or energy, and they change their masters without regret, or much struggle. The Asiatic sovereigns, shut up in their seraglios, oppose only a vain show of resistance to the audacity of their conquerors, while the latter are scarcely seated on the throne before they give way to the same effeminacy which procured the downfall of their predecessors. The organization of the armies, which are composed chiefly of cavalry, and the want of strong places, open the road to sudden and rapid invasions. Every thing combines to facilitate the total and frequent subjugation of those vast empires of the east.

But this state of things is so little founded upon the physical geography of Asia, that we now see India divided into more than 100 sovereignties; Persia in part dismembered, and Turkey in Asia ready to fall in pieces. Ancient history informs us that all the regions of Asia were originally divided into numerous small kingdoms, in which the will of the monarch found limits in the rights of the nation. Asia has seen several republics The resistance which Tyre and Jerusalem opposed to the conquerors of the world, was not owing, as Montesquieu[d] says, "to the heroism of servitude." The Persians of Cyrus were not slaves. The Scythians spoke the language of independent men to the conqueror of Darius.

The astonishing rapidity of political revolutions in Asia arises, however, out of one fact which is really dependent on its physical geography. "In that part of

[a] De Aer. aquis, et locis § 76.
[b] Ibid. § 72 73

[c] Compare p. 196, 198.
[d] Spirit of Laws.

the world," says Montesquieu,[a] "weak nations are opposed to strong; people warlike, brave, and active, border upon those who are effeminate, idle, and timid; the one must necessarily be conquerors, and the others conquered. Here we have the principal reason of the liberty of Europe, and the slavery of Asia." It is necessary to combine this just remark with another truth, proved by physical geography, namely, that Asia has no temperate zone, no intermediate region between very cold and very hot climates. The slaves inhabit the hot, and the conquerors the elevated and cold regions. The latter are the Tartars, the Afghans, the Mongols, the Mantchous, and others, comprised under the name of Tartars by the moderns, and Scythians of Asia by the ancients. Here we find a totally different physical and moral nature; courage animates their strong and powerful bodies, good natural sense is attached to their grosser fibres; they have no sciences, no fine arts, no luxury; their savage virtues are unpolished; their morality, though rude and imperfect, is deeply engraven in their hearts; hospitality to strangers, honour to an enemy, and a fidelity wholly inviolable, to their own nation and friends. To counterbalance these good qualities, they are addicted to war, or rather to pillage, and a wandering life, and live almost in a state of anarchy. Such were the Scythians; such are the Tartars. They defied the power of Darius; they gave a great and sublime lesson to Alexander the Great; they heard from a distance the victorious arms of Rome, but they did not feel their pressure. More than twenty times they have conquered Asia, and Eastern Europe; they have founded states in Persia, in India, in China, and in Russia. The empires of Tamerlane, and of Gengis-kan, embraced the half of the ancient continent. That vast nursery of nations appears to be now exhausted; only a few of the Tartars remain formally independent; but they are still the masters of China, and rather the allies and vassals, than the subjects of Russia.

We must now notice the limits of the two zones into which Asia is divided in regard to its climate and productions. If we draw a line from Mingrelia, along Caucasus, round the Caspian sea, along the mountains which form part of the limit of Persia, towards Cashemire, across Thibet, then turning to the north-east, through the northern parts of China, to the north of Corea, we shall have nearly traced the limit between the hot and cold climates of Asia. Of course, the frontiers of each of the zones will sometimes be confounded; and upon the frontiers also, there will be climates similar to those of Europe, particularly in western Asia. Generally speaking, however, this line will point out the rapid transition from heat to cold.

Rice and maize are the food of the southern nations; millet and barley of the inhabitants of the cold zone; and on the borders of each we find countries of wheat. Nature produces in the southern regions delicious fruits, and in some parts the strongest and most pungent aromatics; but the northern countries are deprived even of the productions of the orchards of northern Europe. The region inhabited by the rein-deer marks, in the north and north-east,[b] the vast space which is, and which will long be inaccessible to all cultivation. The Tartars, the Mongols, and part of the Persians, owe their taste for riding, robbery, and war, to the great number of horses which they possess. In all the west, the camel is made use of for commercial and social communication; the elephant is useful in agriculture, in ancient times he was formidable in war, and had great influence on the ancient civilization of India. China, deprived in a great measure of the assistance of these different animals, has supplied the deficiency by the quantity of boats with which its rivers are covered.

The want of wood for building has obliged the inhabitants of the central plateau, and of the north of Asia, to lodge in tents covered with skins or stuffs, both of which are the produce of their herds and flocks. A similar necessity has produced the same result in Arabia. On the contrary, in India and other countries, rich in wood, but particularly in the palm, small and slight houses were suitable to the indolence of the natives, as well as to the mildness of the climate. As both these kinds of habitations offer nothing firm and solid, the towns of Asia disappear like the empires of which they are the momentary centres. This general character of the Asiatic houses, necessarily excludes the taste for valuable furniture, pictures, and statues, so that the fine arts can never make any progress. On the other hand, the uniform influence of a climate, which imperiously determines the sorts of cultivation and food for each region, and the irresistible influence of religious superstitions, despotic laws, and servile morals, banishes from the soul of the Asiatic those animated and free emotions which in Europe inspire the breast that possesses a relish for literature and the sciences. Thus the different regions of Asia afford, in almost every part, some remains of a civilization upon which physical advantages and disadvantages impress an indelible character; but in every part also, this civilization is only in a very inferior degree, in comparison with that to which the people of modern Europe have attained.

We shall now describe, in the order of its great natural divisions, that vast portion of the world of which we have given a general outline.

NATURAL DIVISIONS OF ASIA.

I. Region of Caucasus	Government of Caucasus; Abassia; Circassia; Georgia, &c. Daghestan; Shirwan.
II. Region of Asia Minor	Anatolia; Caramania; Sivas; Trebisond; Islands of Cyprus, Rhodes, &c
III. Region of the Euphrates and Tigris	Armenia; Kurdistan; Mesopotamia, or Al-Djesira; Babylonia, or Irac-Araby.
IV. Region of Mount Libanus	Syria with Palestine.
V. Region of Arabia	Arabia.
VI. Region of Persia	Persia.
VII. Region of the Oxus and of Lake Aral	Great Bucharia; Western Turkestan, The Steppe of the Kirghis, Turcomania, or the country of Truchmenes.
VIII. Region of the great central Plain	Kalmuk Tartary. Mongol Tartary; Little Bucharia
IX. Region of the Obi, and Yenissei.	Western Siberia.
X. Region of the North East	Eastern Siberia, with Kamtchatka.

[a] Spirit of Laws. Book xvii. chap. 3.

[b] See Book XXI. Zoological Geography.

XI. Region of the river Amur	Chinese Tartary, with Corea.
XII. Insular region of the East	Kurile Islands, Tchoka and Jesso. Islands of Japan, Loo-Choo, Formosa.
XIII. Region of the Blue River and of the Yellow River	China Proper.
XIV. Region of the sources of the Ganges	Thibet.
XV. Region of the Ganges	Eastern Hindostan.
XVI. Region of the Indus	Western Hindostan.
XVII. Region of the Deccan	Peninsula of India, on the west of the Ganges, with Ceylon and the Maldive Islands.
XVIII. Region of Chinese India	Peninsula of India beyond the Ganges; Birman empire; Siam; Cochin China; Malacca.

In this plan of division adopted for the present and succeeding volume, we have sought the most luminous and agreeable method of studying the topography of Asia, and connecting the particular descriptions. This is the reason why we have not been very scientifically strict, and have often classed in one groupe countries which have little interest, or are little known.

BOOK XXV.

CAUCASIAN COUNTRIES.

Georgia, Abassia, Circassia, Plains of the Kuban, Daghestan, and Shirwan.

THE regions bounded by the Caspian Sea on the east, on the south by the rivers Kur and Rione, or Phasis, on the west by the Black Sea and the Palus Meotis, or Sea of Azof, and on the north by the rivers Manitch and Kooma, form a kind of isthmus which connects Europe with Western Asia, and across which Mount Caucasus extends like an immense wall.

The breadth of this isthmus, according to the best Russian authorities,[a] is about 400 miles,[b] between the mouths of the Don and the Kooma; about 756[c] between the straits of Caffa and the peninsula of Absheron; and about 350[d] between the mouths of the Phasis and the city of Derbend.

The etymology of the name of Caucasus, so celebrated in history and poetry, is not agreed upon; the most probable opinion is, that it is a compound of a Persian word *Caw*, signifying "a mountain," and a Scythian word *Cas-pi*, that is "a white mountain." This opinion is supported by a passage of Erastosthenes, where he informs us that the natives of Caucasus called it Caspios;[e] but Pliny says that the native name was Graucasus, which may be considered as Gothic.[f] The Caucasian nations seem at present to have no general denomination.[g]

The ancients compared Caucasus to the Alps in point of elevation. They have indeed some just resemblance, for the middle of the chain is covered with glaciers, or white with eternal snows.[h] Reineggs considers the Elboors, which is the highest summit of Caucasus, as only 5900 feet[i] above the level of the Black Sea.

On the south Caucasus joins the numerous chains of Mount Taurus, which extend through Western Asia; to the north it borders almost immediately on the vast plains where the Sarmates once wandered, and where the Cossacks and Kalmuks now roam; towards the east, its rugged precipices bound the narrow plain which separates it from the Caspian Sea;[k] on the west, the high chain terminates abruptly to the north of Mingrelia by rugged mountains, called the *Montes Ceraunii* by the ancients. The inferior chains then stretch along the coast of the Black Sea, and form the low mountains which separate the Circassians from the Abassians, and which the ancients call *Montes Coraxici*. Among the summits of Caucasus we distinguish the Elboors, or rather *Albordj*,[l] in the country of the Ossetes, and the *Bishbarmak*, or Five-fingered Mountain, in Lesghistan. There is a promontory which runs into the country of the Circassians, so rich in fine horses, which was called among the ancients *Montes Hippici*. Its name among the moderns is *Beesch Tau*.

The two principal passages of Caucasus are mentioned by the ancients under the name of the Caucasian and Albanian passes.[m] The first is the defile which leads from Mosdok to Tiflis. It is the narrow valley of four days journey, where, according to Strabo, the river Aragon, now called Arakui, flows.[n] It is, as Pliny calls it, an enormous work of nature, who has cut out a long opening among the rocks, which an iron gate would be almost sufficient to close.[o] It is by this passage, according to Priscus, that the barbarians of the north threatened both the Roman and the Persian empires.[p] The ancients gave different names to the strong castle which commands this passage. It is now called Dariel. The Albanian passes of the ancients were, according to common opinion, the pass of Derbend, along the Caspian Sea. But, if we compare with care all the records which the ancients have left us; if we reflect that in no description of this pass is the Caspian Sea mentioned; if we remember that Ptolemy expressly placed the Albanian passes, near the sources of the river *Kasius*, which, according to the whole tenor of his geography must be the modern Koisu; that the same geographer places the *Diduri*, neighbours of the *Tusci*, near the Sarmatian passes, and that these two tribes, under the names of Didos and Tushes, still dwell near a defile passing through the territory of Ooma-Khan, along the frontier of Daghestan, and then traversing the district of Kagmamsharie,[q] we shall conclude that to be the place where we must look for the Albanian or Sarmatian passes, which have hitherto been misunderstood. The name of the Caspian pass belonging properly to a defile near Teheran, in ancient Media, is vaguely applied by Tacitus and some other ancient writers, to different passes of Mount Caucasus. But we must distinguish from all these passes which traverse the chain from south to north, the Iberian passes, or the defile of Parapaux, now called Shaoorapo, by which they pass from Imeritia into Kartalinia, a defile in which, according to Strabo, there were precipices and deep abysses, but which in the 4th century the Persians rendered practicable for armies.[r]

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[a] Map of Caucasus by Lapie. Annales des Voyages, Vol. XII.
[b] "64 myriamètres."
[c] "122 ——— ——"
[d] "56 ——— ——"
[e] Rommel, Caucasi Straboniana Descriptio, p. 62.
[f] Pliny, VI. 17.
[g] Compare Busching, Description of Caucasus, in his "Nouvelles Hebdomadaires," 1781, p. 381. Wahl, Asien, I. 793, &c. Wilford, Asiatic Researches, VI. 455, *sqq.*
[h] Guldenstedt, Voyages, I. 434, (in German.) Reineggs, Description of Caucasus, &c. I. 16, (in German.) Compare Procop. Bell. Goth. IV. c. 3.
[i] "5400 Fr. feet."
[k] Gmelin, Travels, III. 34, 35.
[l] From Bordj, or Borg, a Persian word signifying a mountain. (Wahl.)
[m] *Pylæ* or *portæ*, gates.
[n] Strabo, XI. 765.
[o] Pliny, VI. 11.
[p] Prisc. de Legation. p. 43. Comp. Procop. Pers. I. 20.
[q] Lapie, Map of Caucasus. Annales des Voyages, XII.
[r] Procop. Bell. Goth. p. 600. Guldenstedt, I. 314.

A tradition very generally prevalent among the natives of these countries is, that a great wall had in former times protected Caucasus from the invasions of the barbarians. This great work is sometimes attributed to Alexander, and sometimes to Nooshyrvan; the remains of a wall may be seen, but it is very uncertain whether these belong to a wall which traversed all the isthmus, or rather made a part of some local fortifications.[a]

Both the ancients and moderns agree that the Caucasian countries possess mines of gold, silver, and iron. Several rivers carry down gold dust mixed with the sand, which, being stopped by sheep skins placed on purpose, furnishes an explanation of the fable of the golden fleece.[b]

The summits of Caucasus are formed of granite. On each side the granite has schistous mountains joining it, and these are followed by calcareous. The chain is said to present a great regularity, and its direction in a straight line renders the assertion probable. But the calcareous mountains appear to occupy more space on the southern side, where the chain is extended by a greater number of branches. On the northern side, the base both of the calcareous and schistous mountains is covered by vast sandy downs which disappear by degrees in the barren plain called the Steppe of Kooma.

Caucasus is one of the most interesting regions of the globe, both for its natural and its civil history. We find there every climate of Europe, and every kind of soil. In the centre, we have eternal ice and barren rocks, inhabited by bears and wolves, also by jackals,[c] *chaus*, (an animal of the genus *Felis*,[d]) the wild goat of the Caucasus, (Capra Caucasica,[e]) which delights in the rugged summits of the schistous mountains; the chamois, which, on the contrary, prefers the lower calcareous mountains; hares, polecats, ermines, argalis, and an infinite number of birds of prey, and of passage. To the north are hills fertile in corn, and rich pastures where the fine Circassian horses are bred. Farther on are sandy plains, covered with coarse plants, but mixed with low grounds of a more clayey soil. To the south you find magnificent valleys and plains, displaying, under the most salubrious climate, all the luxuriance of an Asiatic vegetation. Wherever the declivity inclines towards the west, the east, or the south, cedars, cypresses, savins, red junipers, beech trees, and oaks, clothe the sides of the mountains.[f] The almond, the peach, and the fig, grow in abundance in the warmer valleys, sheltered by the rocks. The quince, the wild apricot, the willow-leaved pear tree, and the vine, abound in the thickets and woods, and on the borders of the forests. The date-tree, the jujube, and Christ's thorn, are indigenous in this country, and prove the mildness of the temperature. The low marshy grounds are adorned with very fine plants, such as the *rhododendron ponticum*, and the *azalea pontica*. The cultivated and wild olive trees, the oriental plane, together with the male and female laurels, embellish the coasts of the Caspian sea. The high valleys are perfumed by the syringa, the jessamine the lilac, and the Caucasian rose.

Each of these tribes preserves its particular language, the idioms of which might probably be traced back to the very earliest period. The Caucasian physiognomy combines the characteristic features of the principal races of Europe, and of Western Asia. The domestic animals, and cultivated plants of these two parts of the world are found in Caucasus, or in its environs. The writings of Moses, the allegory of Prometheus among the Greeks, the famous expedition of the Argonauts, and several traditions of the Scandinavians, all combine to make us consider this country as one of the points from whence the human race extended itself over a great part of the globe. But these questions are beyond the limits of this work. We shall class the Caucasian nations under seven great divisions, corresponding to the seven principal languages which they speak, namely,

I. The Georgians, subdivided into
- [a] Georgians, properly so called.
- [b] Imeritians.
- [c] Gurians.
- [d] Mingrelians.
- [e] Suanes.

II. The Abassians, subdivided into several tribes.

III. The Tcherkesses, or Circassians
- [a] Circassians of the Kuban.
- [b] Circassians of Kabardia.

IV. The Ossetes, divided into several tribes.

V. The Kistes, or Tchetchenzes, with the Ingooshes and other tribes.

VI. The Lesghians, divided according to their eight dialects.

VII. The remains of the Tatars, Mongols, Huns, and other foreign colonies scattered over this country.

Georgia, properly so called, demands our first attention, being situated in the centre of the isthmus. The Russians call this country *Grusia*, and the Persians *Gurgistan;* but the native writers[g] comprehend the four kingdoms of Kartueli, Imeritia, Mingrelia, and Guria, under the general name of *Iberia* or *Iweria*. It appears that this classical denomination is unknown to the greater part of the inhabitants. According to some modern authors, the name of Georgians comes from that of the great river *Kur*, (Kor, Kyros, or Cyrus) which waters this fine country, and they ought rather to be named *Korgians*, or *Kurgians*.

The divisions which took place in the middle age between the princes of Iberia gave rise to three kingdoms, that of Imeritia, from which Mingrelia and Guria were afterwards separated, and those of Kartalinia, or Kartuel, and of Kachetia.

Imeritia has sometimes been known under the name of Turkish Georgia, and the remainder has been called Persian Georgia. It is to this latter portion that recent authors, particularly the Russians, confine the name of Georgia. This country is subdivided into five provinces, namely, upper Kartuel, middle Kartuel, lower Kartuel, Kacheti and Somchet. Heraclius, a valiant prince, formed about 30 years ago, an independent state, which now, under the name of *Grusia*, is incorporated with the Russian empire.

The *Kur*, which waters the great valley of Georgia,

[a] Bayer, de Muro. Caucas. Reineggs, I. 120. Guldenstedt, I. 489.

[b] Strabo, XI. passim. Pliny, XXXIII. 3. Plutarch in Pomp. Appian. de bello Mithrid. p. 797. Procop. Bell. Persic. p. 45. Tavernier, Vol. I. book 3. p. 295. Lamberti, Relaz. della Colchide, p. 193. Gmelin, III. p. 51. Peyssonel, Traité du Commerce, &c. II. p. 80. Guldenstedt, I. p. 286, 418, 462, particularly p. 428. Reineggs, I. p. 21, 25, 188, &c. II. p. 92, 133, &c.

[c] Guldenstedt, Novi comment. Petrop. vol. XX. p. 49, &c

[d] Guldenstedt, p. 483.

[e] Pallas, Comment. Petropol. 1779. Part II. p. 274.

[f] Guldenstedt, I. 435, &c.

[g] Eugene, archimandrite, Description of Georgia, in the "Annales des Voyages," XII. 74.

is increased by the Aragui, the Iora, probably the *Iberus* of the ancients, and the Alasan, which is their *Alazo*. When it reaches the plains of Shirvan, its waters are mixed with those of the Aras, or Araxes; the two rivers form several branches, sometimes united, and sometimes separated, so that it appears uncertain, as it was in the time of Strabo and Ptolemy, whether their mouths should be considered as separate, or the Kur be supposed to receive the Aras.

Georgia enjoys a very mild temperature, and in general is very healthy. It presents an agreeable variety of mountains, forests, and plains. All the common productions of the Caucasian countries abound in it; but the inhabitants are not numerous, and neglect the gifts of nature. In the dry season, which generally commences in the month of May and ends in November, the people of Georgia are occupied in watering a soil which yields them, without much labour, the most valuable fruits. They cultivate wheat, *gom*, or *Holcus bicolor*, and millet. Peaches, apricots, almonds, quinces, cherries, figs, and pomegranates, flourish with very little care. The vines are abundant, and of a good quality, and the wine that is made from them is sent to Persia. That of *Kacheti* does not keep well, because it is badly made, but it is strong, and sparkles in the glass. Apples, madder, and cotton, are cultivated with care; they boast of their management of bees; their horses and horned cattle equal the best European breeds in size and beauty; and the sheep with large tails afford excellent wool.[a] The finest oaks and firs are suffered to rot without being applied to any use.[b]

The Georgians, or rather the Iberians, a native people of Caucasus, speak a language radically different from all other known languages, and in which, in the twelfth century, a great many historical and poetical works were composed.[c] They imagine, however, that they are descended from a common stock with the Armenians. They are in general handsome, well made, and active; nor are they deficient in natural understanding, but selfish, and addicted to drinking. They have adopted in some degree the Persian costume, because their nobles were often brought up at the Persian court, and the people served as guards to the sovereigns of that country. The Georgians are rarely without their arms; even in the fields they carry by their sides guns and daggers, to be in readiness against the robbers of the neighbouring mountains.

The wretched state to which wars and revolutions have reduced this fine country has prevented the natives, notwithstanding their taste for commerce and travelling, from having any very considerable trade. The Armenians act as their agents. Their women, whose beauty is not less celebrated than that of the Circassians although their skin is not so white nor their figure so graceful, have imbibed a spirit of licentiousness and of corruption from their frequent intercourse with strangers. The girls sold as slaves become victims of their beauty. A great many Georgians inhabit huts that are half sunk in the earth. In Kacheti, a province whose civilization has made more progress, we find a kind of house formed of a slight wooden frame, walls made of hurdles of osiers covered over with a mixture of clay and cow-dung, and surmounted by a roof of rushes. A room thirty feet long and twenty broad, where the light comes in at the door; a floor upon which they dry madder and cotton; a little cavity in the middle of the apartment, where the fire is placed, and above it a copper cauldron attached to a chain, and enveloped with a thick smoke, which escapes either by the ceiling or the door: such is the general structure of these houses. We find in almost all the villages, towers which, at the approach of the hordes of Lesghians, serve as an asylum to the women and children.

Teflis, Tiflis, or *Tbilisi*, the capital of all the country, generally reckons about 20,000 inhabitants; there are twenty Georgian churches, fifteen Armenian, one Catholic, and a Persian mosque. Their manufactures are of the most simple kind. At *Mzcheti*, the ancient residence of the Kings, there is a very handsome cathedral, founded about nine centuries ago. The town of *Tzchinval* is peopled with Jews; that of *Gori* with Armenians.

The population of Georgia may be computed at 300,000 individuals, two thirds of whom are indigenous, and attached to the Grecian ritual. The Armenians and Jews are very numerous.

Before the royal family, whom some writers assert to be descended from a Jew called Bagrat, and others from a Persian nobleman named Pharnabazes, had yielded up its rights to Russia, Georgia was a feudal monarchy, which several excellent princes in vain endeavoured to consolidate and improve. The princes and the nobles formed two distinct classes. The first paid no contributions, but during war they were obliged to follow the king with their vassals. The lawsuits which were carried on between them were judged by the king. The nobles paid certain taxes to the king and to the princes. Although they dwelt in thatched cottages, their pride was equal to their poverty and their ignorance.[d] The people lived in the most abject slavery; they were sold, given, and put in pawn, like domestic animals.[e] All who were capable of bearing arms were soldiers; each nobleman commanded his respective vassals; but the king named the commander in chief. The revenues of the sovereigns consisted in the fifth part of all the productions of the vineyards, fields and gardens; also the duties upon all exports and imports, as well as the produce of the mines, which were but slightly worked.[f] This country is now a province of Russia.

The Imeritians, whose name is derived from that of the Iberians, join the Georgians on the north-west, and speak a Georgian dialect. Their dress consists of little caps, peculiar to them; long hair; a shaved chin; mustachios turned upwards; clothes scarcely reaching the knees, and forming a great many folds upon the haunches; ribands rolled round the calves of their legs; and broad girdles. From twenty to twenty-five thousand families live under the authority of a hereditary czar, who has often acknowledged himself the vassal of Russia. The Imeritians live along the sides of rivers and

[a] Guldenstedt, I. 353, 361, 369, &c. Reineggs, II. 109, 120
[b] Reineggs, II. 45, &c.
[c] Eugene, Annales des Voyages, XII. p. 86—90.
[d] Reineggs, II. 53. 123.
[e] Guldenstedt, I. 351—354.
[f] Ibid. I. 356.

woods. On account of its elevated situation, the country remains for a long time covered with snow. The valleys are marshy. The care of cattle, of bees, and of silk-worms, is here carried to a greater degree of perfection than in all the other countries of Caucasus. A single vine supplies a whole family with wine.[a] The indolence of the inhabitants allows the rich gifts of the soil and climate to perish in a most useless manner. It was here that in old times, the Rione or Phasis had 120 bridges over it, and where there was a continual transfer of merchandise, that united in some measure this river to the Cyrus, and consequently the Caspian to the Black Sea; it is now crossed only in small boats of the hollowed trunks of trees. We still see the ruins of Sarapana, now called Schoraban, and the town of Cotatis, or Kutaïs, probably the ancient Cytæa, near which the czar resides in a kind of camp.[b] The trifling commerce of the Imeritians is generally confined to two places, situated upon the Rione at Oni, and at Choni, where grain, horses, and copper utensils, are exchanged for cloths and stuffs. At Zadis, towards the eastern side, the hematites is found from whence iron is extracted, of which different utensils are made.

Towards the north, is situated Radsha, the principal district, which can raise about 5000 soldiers. The villages of the plain are of great extent; in those of the mountaineers, the houses are built close to one another. Those of the first people are made of hurdles of osiers; those of others are of boards.[c]

The *Gurians* inhabit the country situated on the borders of the Black Sea, to the south of the Phasis. Ruined by the neighbouring pashâs, they pay no attention to navigation or fishing; and do not profit by any of the numerous advantages which are offered them by nature. Guria enjoys a healthy temperature, a soil suitable to agriculture and to the breeding of cattle, and a climate in which lemons, olives, and oranges flourish. Of all the environs of Caucasus, it is only here that these fruits ripen. This people, as well as their language, have received mixtures from other nations; and besides the Turks, whom their prince, called the *Guriel*, is obliged to respect, Tartars, Armenians, and Jews, are also to be met with.

On the coast of the Black Sea, below[d] the Gurians, are the Lazians, which signifies in the Turkish language, people belonging to the sea;[e] it is possible that these are the remains of the ancient *Lazi*, who, in the time of the Byzantines, were established in Colchis.

The *Mingrelians* dwell above[f] the Gurians, and by the side of the Imeritians, in the same country which the Colchians once possessed, and afterwards the ancient Lazians. Ancient cities in ruins, Turkish or Russian fortresses upon the borders of the sea, vessels loaded with slaves which sail for Turkey, princes and nobles who pillage wherever they go, women who betray their husbands, contests between all the villages, and frequent irruptions of foreign armies—now form the picture of Mingrelia. The costume of these people consists of a cap of felt, their feet either bare or enveloped in skins, which afford poor protection against the mud of this damp country, with their shirts and clothes extremely dirty: such is the appearance of the men, surrounded by women who lead a life of debauchery, eat with their fingers, and bring up their children to lying, pillage, and marauding. The following is the manner in which a Mingrelian nobleman procures slaves. During a sudden attack, or a precipitate retreat, he watches one of the enemy whom he can dismount, and whom he can in this manner make his prisoner, and with a cord attached to his girdle, he binds the prisoner as soon as he has got him off his horse. The sale of slaves also takes place during peace; for in Mingrelia the master sells the servant, the father his son, the brother his sister.

Besides slaves, the Turks go to Mingrelia to purchase silk, calico, furs, and particularly the skins of the beavers; and also red and white honey. They give in exchange sabres, bows and arrows, ornaments for the horses, cloths, coverlids, and even copper and iron; for the ancient possessors of the golden fleece do not at present work any mine. Near Iskuriah, or Isgaour, the ancient *Dioscurias*, on the north side of the country, and near the frontiers of the province of Odishé, is the principal mart for trade. Turkish money passes there. The port of *Anarghia*, situated lower,[g] and where Mingrelia properly so called commences, is also the resort of great commerce.[h]

Mingrelia is still as damp, hot, and subject to fevers as when Hippocrates described it under the name of Colchis. In summer there are pestilential diseases, which are destructive both to men and animals. Vegetation is very rapid, and all the fruits are produced without the care of grafting; but it must be allowed that their flavour is not always the finest. Chestnut and fig-trees are in abundance.[i] The wine alone can be praised, which is wholesome and full of spirit. There is also rice, millet, and *gom*. The Mingrelians do not now cultivate flax,[k] which, in the time of Herodotus and of Strabo, furnished the Colchians with the materials of an important manufacture, of which Chardin observed some remains. The only object to which they appear to give any attention is the management of bees. The honey of some cantons, where the *Azalea pontica* abounds, is bitter,[l] as was observed by Strabo. It was beyond the Phasis, in *Guria*, that Xenophon found a kind of honey which caused a species of delirium in those who ate of it, an effect which Pliny attributes to the rhododendron, a shrub which abounds in the forests where the bees swarm.[m]

The Mingrelians are very superstitious: the missionaries of the 17th century were unable to suppress a *fête* which was celebrated in honour of an ox, and which reminds us of the worship of Apis. The prince of Mingrelia assumes the title of *Dadian*, or master of the

[a] Reineggs, II. 47—50. Guldenstedt, *passim*.
[b] Kotais contains 2000 inhabitants, nearly one half Jews. *Gamba*.—P.
[c] The population of Imeritia, in 1821, was 80,793; houses, 12,994. *Gamba*.—P.
[d] S. W.—P.
[e] "*Marins*," Seamen.—P.
[f] N.—P.
[g] Farther south.—P.
[h] Friebe, Trade of Russia, I. 123, *sqq*. (in German.)
[i] Reineggs, II. 29, *sqq*. Guldenstedt, I. 400—408.
[k] Reineggs, II. 50.
[l] Guldenstedt, I. 275, 281, 297, *sqq*.
[m] Xenophon. Cyri exped. IV. 8. Pliny, XXI. 13.

sea, though he possesses not even a fishing boat: he generally moves about with his suit from place to place, and his camp is the scene of licentiousness as well as poverty.[a] The noblemen of Mingrelia are addicted to the chace, and they are acquainted with the art of training birds of prey, which they make use of to kill the game. According to a Mingrelian proverb, a good horse, a good dog, and a good falcon, are three indispensable things for human happiness. The chace furnishes the Mingrelian with abundance of venison. In their repasts, they also eat pheasants, with which the country near the Phasis abounds. The Mahometans are in great numbers in Mingrelia; they regard with great indignation the abundance of wine and pork, while they are unable to procure good bread. To the east of Odishé and Mingrelia, is situated the small Mingrelian province of Leshkum, where the inhabitants live in huts of stone.[b]

A large ravine, which extends from south to north, separates the last mentioned country from that of the *Suanes*, a people who live near the Elboors, the highest summit of Caucasus. The Suanes, whose name is derived from a word signifying in their language the inhabitants of the high mountains,[c] are at present free, and have no connexion with the Georgians except in their dialect. Nothing can equal their want of cleanliness, their rapacity, and their skill in the use of weapons. The women cover their heads with a red linen handkerchief in such a manner, that only one of the eyes can be seen.[d] This is probably the origin of the geographic fable of a nation of one-eyed people, or Monommati. We may also consider the *Phthirophagi*, or the ea of vermin, who, according to Strabo, inhabited this ntry, as the progenitors of the Suanes. The almost ccessible mountains of slate which separate Mingrelia from the countries of the Abasses and Basians, and which are extended to the confines of this last province, place the Suanes out of all danger. They consist of about 5000 families, who live there without a chief and without a prince. Dreaded formerly by the Byzantine empire, they are still renowned for their savage valour; a tall and commanding figure contributes to make them appear formidable. They know the use of the musket; they can make powder, and all kinds of weapons, for which their mines furnish them with materials. We find among them not only lead and copper, but vases, and chains of gold and silver.

The *Abasses*, or Abasgians, dwell above[e] the Suanes and Mingrelians, in a country situated at the foot of Caucasus, at the north-west extremity, partly upon the borders of the Black Sea, where there are several ports and strong places belonging to the Turks; and partly towards the source of the river Kuban, where the mountain Elboors rises, which overlooks the six tribes of Abassians, called by the Tartars *Altikesek*. The first part is great Abassia, a very fertile country, although mountainous; the second is little Abassia, where the inhabitants, oppressed by their neighbours the Circassians, are obliged to seek an asylum in the defiles of the mountains, where their numbers are gradually diminishing.

The Abassians, who give themselves the name of *Absne*, are well made, hardy, and active: their national physiognomy is very remarkable; they have an oval face, a head compressed on each side, a short chin, a large nose, and hair of a deep chestnut colour. The Greeks formerly knew them as cunning and formidable pirates, by the name of *Aschœi*. Under the name of *Abasgi* they were described among the Byzantines as infamous for their traffic in slaves. The Circassians one day invited the Abassian Princes to an assembly, and after having gained their confidence, they murdered the chiefs of this free people. Since that period the Abassians, abandoned to civil wars, have lost the little civilization which they had received from Constantinople. We find, however, in the celebration of Sunday, a slight trace of the Christianity which they formerly imbibed. Some of them wander peaceably through the forests of oaks and alders, which cover the country, while others support themselves by a little agriculture; all however are more or less inclined to robbery, and sell each other to the slave merchants.[f] The language and customs of the Abassians very much resemble those of the Circassians;[g] while Pallas affirms that their language appears to have no relation with any known one.[h] It is supposed that there are mines of silver in those parts, but they are not worked. The situation of the inhabitants is adapted to navigation and fishing, but they do not take advantage of it.

The chief trade of the Abassians consists in mantles of cloth and felt, in skins of foxes and pole cats, in honey, in wax, and box-wood, of which the Turks make considerable purchases. The Turkish and Armenian merchants, who bring them salt and stuffs, are obliged to be constantly on their guard against the attacks of these perfidious savages, who, whenever they are strong enough in numbers, rob friends and enemies without distinction.[i]

Abassia is, in general, covered with forests, where the heat and moisture keep up as abundant a vegetation as in those of America; and the convolvuli[k] stifle the trees under their twining branches. It is not true that Sootchookalé[l] is the only good port which that long coast possesses.[m] Ghelindjik also affords a vast and deep harbour.[n] Pitzounda, the ancient *Pityus*, formerly flourished by its commerce. Mamai appears to hold the first rank among the towns or villages of the country. The tribes of the Abassians are in great numbers. We particularly know the Beshilbai, the Shapsiches, and the Natuchashes. The first inhabit a mountainous and inaccessible country near little Abassia; the Shapsiches dwell further towards the west, among whom the greatest marauder is generally their chief prince. They make incursions as far as the town

[a] Felix Lagorio, Letters on Mingrelia, Annales des Voyages, IX.
[b] There are three provinces in Mingrelia, viz. Odeschi, Lesguine, and Abkazia. *Gamba.*—P.
[c] Pallas, Travels in the South of Russia, I. p. 419, (in German.)
[d] Reineggs, II. 15—17.
[e] North.
[f] Reineggs, I. p. 265, *sqq.* Guldenstedt, I. 464. Comp. Chardin, Lambert, &c.
[g] Guldenstedt, I. 464, 467.
[h] Pallas, Voyage dans la Russie méridionale, I. 372.
[i] Peyssonel, Traité du Commerce, II.
[k] "Lianes," vines or climbing plants, in general.—P.
[l] "Soudjoukalé or Soutchoum-Kalé."
[m] Guldenstedt, Journal of Pétersbourg, 1. 1776, May, p. 16.
[n] See the plan in the "Annales des Voyages," V. 210.

of Anapa,[a] where they harass the Turks. The Natuchashes, the strongest and the most considerable of the tribes, dwell nearer the coast. Springs of naphtha are found there, similar to those which are found in the southern part of Caucasus.

To the north of the country of the Abassians we meet with the mouths of the Kuban, which, flowing from the central part of Caucasus, receives in its course nearly all the waters of the western branch of that chain of mountains. The sandy plain which extends to the north of this river does not furnish it with any branches. Its two mouths embrace the island of Taman, which is flat and marshy but fertile, and in which the town of Fanegoria, the ancient Phanagoria, attracts a little trade. It belongs to the Russians, as well as the whole plain to the north of the Kuban, and the south-east of the sea of Azoff. These countries, in which there are beds of salt and sand, alternating with calcareous stones and shells, have hardly any vegetation except on the borders of the rivers. These deserts, the uniformity of which is only interrupted by little clumps of willows, wild vines,[b] and osiers, or by a few elms and aspin trees, now bear the name of the country of the Tchernomorskoi Cossacks, or the Cossacks of the Black Sea.[c] These warlike tribes are the remains of the celebrated Zaporogian Cossacks, of whom we shall give an account in our description of Russia.

The middle and eastern part of this sandy plain which separates the sea of Azoff from the Caspian Sea exactly resembles that which we have just described. It is particularly along the rivers Manitsh and Kooma, that we find plains entirely dry, or slightly moistened with brackish water, containing a great number of shells, and a soil very little elevated above the level of the two neighbouring seas. It is by following the beds of these two rivers that we may discover the traces of that ancient strait, which several learned men have imagined[d] united the Caspian Sea to the Palus-Meotis; because, farther north, some hills rise which separate the Don from the Wolga; and more to the south, in approaching the sources of the Kuban and of the Terek, we find the soil gently rise, black earth covering the beds of sand, and the common vegetation of these climates replacing the saline plants.[e] We shall confine ourselves to this indication of facts, and of the possibility which may arise from them; a discussion upon the actual existence of this strait would be here out of place. Deficient in historical proofs, we readily consign to geologists and poets the consideration of ages anterior to history. This plain was known to the ancients in the same state as it appears at present. The different statements as to its breadth, are, like many other contradictions of the ancients, owing to measurements having been taken carelessly, and without instruments. And, lastly, the passage from whence it is too hastily inferred that, in the fourth century, this isthmus was covered with marshes,[f] relates only to one marshy lake, called *Bolischei*, which is still in existence.

All those low countries which extend to the east of the country of the Tchernomorskoi Cossacks, and to the north of the Kuban and the Terek, form the government, not long ago the province of Caucasia, which forms part of the Russian Empire. It is inhabited by different tribes of Cossacks and of Nogai Tartars. These last, being obliged to wander from pasture to pasture, live in hordes under the protection of the Russians. They subsist on the produce of their cattle, and a little millet, or by occasional robberies. When caught, they have been sometimes punished by the immediate loss of an arm or of a foot, separated on the spot, which savage punishment has spread universal terror among these wretched wanderers. Many eye witnesses have given a most affecting account of the manner in which their relations receive these mutilated individuals: they hasten to stop the blood, by bathing them with warm milk, and then conduct them into their huts, where they take every care of them. The Cossacks form the ruling people, of which the principal tribe bears the surname of Grebenski. A chain of fortresses protects the Russian empire against the invasions of the unconquerable nations of Mount Caucasus. Among these places, *Kisliar* upon the Terek, where there is considerable trade, reckons nearly 12,000 inhabitants; Mosdok and Georgievsk are at present the chief places, and are daily improving in importance and civilization. Millet, Indian corn, rice, fig-trees, and cotton, are cultivated here; but the rigour of the winter, and still more the want of the salutary shelter, furnished elsewhere by the snows, render the existence of the more delicate plants very precarious. There are, however, in the vicinity of the Terek, a great many orchards and vineyards.[g]

After passing the Kuban or the Terek, we find on the northern sides of Mount Caucasus the celebrated nation of the Circassians, whose real name is *Tcherkés*. They may be divided into two classes, the Circassians of the Kuban, and the Circassians of Kabardia, sometimes called Kabardinians. It is probable, that the *Zyges* of Strabo, the *Ziches*, or *Zeches* of the Byzantine authors,[h] were a Circassian tribe, since *Zyg*, in Circassian, signifies a man.[i] The Ossetes still call them Kasachi, which reminds us of the *Kasaches*, established, according to the Byzantine authors, and the annals of Nestor, in the tenth century, in the environs of Caucasus. A similarity in the sound of *Kerketes* in Strabo

[a] This town or rather fortress, in 44° 40′ N. Lat., not far to the S. E. of the Kuban, was restored to the Turks, in the late treaty, by the Russians, though surrounded by the territories which they have retained. It contains 2000 inhabitants. The following, similarly situated, were also restored by the Russians, viz. Poti, at the mouth of the Phasis; Soukoum-Kalé, Anagri, and Redouté-Kalé, at the mouth of the Kopi, a place of much trade, (population 400.) Whatever may have been the policy of the Russians, in restoring these fortresses, the consequences have been unfavourable to them, as they open a direct communication to the Turks, with the Caucasian tribes, and thus enable them to keep up that influence over them, which they derive from their common religion, and also to communicate with the Turkish nations to the east of the Caspian.

The trade between the Black Sea and the Caspian, passes chiefly through Redouté-Kalé, Kotais, Teflis, and Baku; the greater part in wagons drawn by oxen. *Gamba.*—P.

[b] "Viornes," the Viburnum and Clematis. *Jussieu.*—P.

[c] Georgi, Description statistique de la Russie, II. 911. Pallas, Guldenstedt, &c.

[d] Dureau de la Malle. Géographie physique de la mer Noire.

[e] Georgi, Descrip. stat. II. 217.

[f] Prisc. de Legat. apud Stritter, Memoriæ Popul. I. 513, nonobstante Pallas, 1 er Voyage, III. 574.

[g] Georgi, l. c. 932, *sqq.* Guldenstedt, I. 152—156; Busching, Magasin. Geograph. VI. 466.

[h] See Stritter, Memoriæ popul. art. *Zecchica.*

[i] Rommel, Caucasus, p. 12.

to *Tcherkes*, has determined both Pallas and Reineggs to consider that ancient tribe as the true stock of the Circassians. What appears most in favour of this opinion is, that the Circassians are the original inhabitants of these countries.

The most remarkable of the Circassian tribes of the Kuban is, without doubt, that of the Temirgoï; they inhabit more than forty fortified villages, and can levy a force of 2000 men. To the east of the Temirgoï the Beslenes live, a horde who lead a life of ease. Their neighbours are the Muschoks, who are good agriculturists, and breed cattle: they also profit by the fisheries, which their numerous rivers afford them. The Shagacki, below the Turkish fortress of *Anapa*, have a prince who formerly possessed some ships on the Black Sea. The Circassians of Kabardia are a half civilized nation. They inhabit a fertile country, situated about the middle of Caucasus, upon the northern side of that chain, bounded on the north by the river Terek, and on the east by the country of the Tchetchentzi Kistes. It is divided into Great and Little Kabardia.

The Circassians of Kabardia are distinguished from all the people of Caucasus by their beauty and elegance. The men have a Herculean figure, a small foot and strong wrist, and they manage the sabre with wonderful dexterity. The women are delicate, and possess a pleasing and graceful form: their skin is white, with brown or black hair; their features are regular and agreeable, and they pay that attention to cleanliness which heightens the attractions of beauty. This is what renders the Circassian women so much admired, even among Europeans. Some travellers assert that these beauties are admired in proportion to the red colour of their hair. The Circassian, prince or noble, that is to say, whoever is not a bondman, and who possesses a horse, is always armed with a poignard and a brace of pistols; and he rarely goes out without his sabre and his bow. The belt of the sabre is fastened round his body, and a helmet and cuirass cover his head and chest. This is, in fact, a faithful representation of a knight of the 10th or 11th century. The whole of Kabardia can fit out 1500 of these cavalry, called *Usden*, and 10,000 peasants, or bondmen, equipped for battle; but the former, in consequence of continual hostilities among themselves, are very much weakened.

The soil of Kabardia is excellent, and well adapted to agriculture. The winters are nevertheless severe, and the heat is not of long duration. The inhabitants neglect the gifts of nature, and they derive no advantage from the fine forests of oaks, elms, and alders, which cover their hills; their country is said to contain mines of more valuable metals than the iron and brass, which they make use of for their arms.

The Circassians build their houses with a slight wooden frame work, and hurdles painted white, and convey the water from the nearest rivulets with considerable skill by means of a canal. The inns exhibit a laudable degree of cleanliness. The peasants, or bondmen, and the prisoners of war, are charged with the care of farming, and looking after the cattle. They make use of large ploughs, to which are harnessed six or eight oxen. Hemp is one of the natural products of the soil. A great number of goats, sheep, oxen, and horses, form the principal riches of the Circassians. They also traffic in wool and wax. The horses are distinguished for their beauty, their strength, and their agility. Each prince, or nobleman, marks his colts with a hot iron, if they are thorough bred; and whoever profanes that mark, or puts it upon a common horse, is punished with death.

Their feudal system is also remarkable. The vassal, who belongs to the prince as his own property, although not liable to be sold by him, is obliged to do all kinds of personal services, but he pays no contribution. The nobles maintain order among the people, and render military service to the prince: the latter keeps an open table, to the expense of which every person who possesses herds contributes. Marriages are contracted according to the riches and birth of the parties. A plain nobleman who runs away with a princess, incurs the punishment of death. Whenever a prince or princess is born, a nobleman is selected who is to take charge of the child's education. The father and mother banish it from their presence until the period when the son is fit for battle, and the daughter of an age to be married. Under the guidance of his tutor, the youth familiarizes himself with the chace, war, and pillage, and in recompense he divides his booty with him. It was thus that the centaur Chiron brought up the young Achilles. The simple and light diet which a girl of distinction lives on tends to preserve that graceful and slender form so suitable to a princess. She is taught to embroider, to sew, to plait straw, and to make small baskets with it. Newly married persons see each other in private for the space of a year. The woman receives her husband in the dead of the night, and makes him enter by the window. They do not show themselves to their relations until there is an existing pledge of their union. This similarity between the Circassian women and the Amazons is connected with the ancient tradition of the Circassians, of the intercourse they had with a nation, named *Emmetch* (a name from which the Greeks may have made *Amazon.*) Hence that ingenious hypothesis by which the Circassians are identified with the Sarmatians, descended from a mixture of Scythians and Amazons.[a]

The Circassian princes and nobles speak a language peculiar to themselves, and unintelligble to the people. Is this only a political institution, or is it the proof of a different origin?—There exists among the Circassians a right to hospitality called *Kunadi.* Happy is the stranger who obtains it! his host recommends him to all his relatives; and were he charged with the greatest crime, he is still in safety, because his host answers for him. The Circassians denounce dreadful vengeance on those who kill their relations; the whole family of the criminal shares his crime, and if the vengeance of blood be not allayed by a pecuniary indemnity, it is transmitted even by marriage.[b]

These people were formerly Christians, with scarcely any religious worship. They are now Mahometans, but wholly devoid of zeal. The mausoleums of the

[a] Reineggs, Topographie du Caucase, I. 238. Pallas, I. 390.

[b] This was the system in England previous to, and even during the reign of Alfred.—Tr.

Circassians are constructed of hewn stone, and surrounded with colonades.

The *Basians*, who dwell below[a] the Circassians, and by the side of the Suanes, are the ancient inhabitants of Kabardia. Pursued by the Circassian nobles, they were compelled to seek an asylum in the high barren mountains which are covered with snow, and they live there at the present time, still tributary to their ancient persecutors. They are, according to their own account, a mixture of a variety of nations; namely, Bulgarians, Greeks, Kalmuks, Kumuks, but principally Nogais, who are Mongols or Huns.[b]

The Basians comprehend three tribes, the Tshegems, the Balkars, and the Karatshas.

Traces of Christianity are to be found among them, and we are assured that in their country a church is to be seen, which, though ancient, is still in good preservation. A road opened through the rocks, and furnished with a balustrade of iron on both sides, conducts to the church by a serpentine path; and the gospel and the rituals are in the Greek language.

The Basians have very considerable herds of oxen. Their mules are much praised: they cultivate millet and oats; and they extract lead from the mines of Kargatchin Tau, that is to say, the leaden mountain: they prepare saltpetre, and sell gunpowder. M. Reineggs has observed in Basiania a great many interesting objects of natural history; several of the valleys are filled with sulphurous exhalations, and lightning is more frequent there than elsewhere. Near the river Jetchick, which flows into the Kuban, there are hot springs so corroding, that they cause swellings in the mouths of those who drink of them.[c] In the environs of Mount Elboors there is an elevation, composed entirely of a golden-coloured micaceous gravel or yellow mica, which is so loose that men and horses sink in it as in water. Colonades of basalt, in prisms of three, five, eight, and nine sides, are found in the high mountains near the sources of the Terek; but it may be doubted whether M. Reineggs, who has drawn them,[d] knew how to distinguish this enigmatical rock in a correct manner.

The *Ossetes* dwell to the east of the Basians. They are called sometimes Ossi, Ossis, Ossites, or Ossitinians. In this, as in numerous other instances, we adopt the radical part of the name by which a nation is designated either by the people belonging to it or by their neighbours, while the terminating syllables are in some measure arbitrary, till such time as the celebrity or familiarity of the people among those who write about them establishes some unchanging designation. On seeing the clothing, the light chestnut hair, and the red beards of these people, we should say that they were peasants from the north of Russia. They give themselves the name of *Irones*. Their language has some connexion with the German, and Sclavonian, and still more with the Persian. The country of the Ossetes commands the communications with Georgia. It extends from the sources of the Terek to the northern branches of the Kur. In these rugged mountains, all the rivers flow with an astonishing rapidity. The manners of the Ossetes are of a characteristic simplicity; their method of saluting consists in touching the chest for men, and the bosom for women. In their funerals there is a noisy ostentation of grief: the women beat their breasts, and threaten to precipitate themselves from the top of a rock. They afterwards eat and drink in honour of the dead for three days.[e] The houses of the Ossetes resemble so many castles in miniature, and although vassals of Russia, they live in a state of wild independence.

It is alleged that there is met with in that part of Caucasus, a large bird of a very beautiful variegated plumage, resembling a pheasant; the Ossetes call it Sym. A sort of friendly alliance is said to subsist between it and the wild goats, the partners of its solitude. At the approach of the hunter it sends forth a shrill whistle, which serves to warn the quadruped of the impending danger. There are still to be seen in this country thousands of caverns hollowed out of the rugged rock, upon almost inaccessible mountains, and generally of the height of sixty feet. They are now abandoned, but we may still trace the vestiges of the ancient inhabitants.[f] The Russian fort of Dariel is situated on the eastern frontiers of Ossetia. A few slight fortifications, and a small garrison, would render this pass impregnable. At this place, the road now used leads for a considerable way through a subterraneous passage cut in the solid rock.

The most considerable tribe of the *Ossetians* is that of the Dugores. They are said to be tributary to the Badilles, a sort of knights or freemen, living in the highest mountains, and separated by a small river from another equally unknown tribe, that of the Nitigures, a name apparently of Hunnic origin. The Tcherkessates have woods which they esteem sacred, and which are divided into sections, according to the number of their families. They celebrate annual festivals, which last eight days, and resemble that of tabernacles among the Jews. Travellers are hospitably invited to partake, and one of the families is charged with the care of entertaining them. The Dimfars, a republican tribe, are incessantly at war with the Dugores. We find in their canton a cavern of Saint Nicholas, a relic of their ancient faith. This Russian Saint is supposed to appear there under the form of an eagle, to receive the food which is offered to him; of course, there will be no lack of birds of prey exactly to personate the Saint in this particular.—Some missionaries have recently taken a very wise advantage of this people's former profession of Christianity to offer to re-instruct them in the principles of religion and civilization, and these offers were accepted by the late General Kasibek, one of their chiefs, and by those who acknowledged his authority. This is accompanied with a tendency to a good understanding with the Russian government, and an acquiescence in the plans of general amelioration happily begun in these countries. The advantage of this change begins to be felt by those travellers who cross the Caucasus along the chain of Russian posts from Mosdoc to Tefiis, up the precipitous

[a] South.

[b] The Nogais are properly a Tartar nation. Malte-Brun himself ranks them with the Tartars in his *synoptic table*, Book 40, but adds that they have a mixture of Mongolian blood.—P.

[c] Reineggs, Topographie du Caucase, I. 291.

[d] Reineggs, ibid. I. 286. tab. iii. Compare Georgi, II. 970.

[e] Reineggs, I. 218.

[f] Pallas, premier voyage, VII. p. 55—79. Reineggs, I. 233

banks of the Terek, and down those of the Aragui. A strong Russian escort is necessary for security, but a distant approximation to co-operation on the part of the natives is agreeable and encouraging.[a] Sir Robert Ker Porter was hospitably entertained at the house of General Kasibek's family, near the mountain called Kasibek. He and his party were struck with the contrast between the dutiful civilities paid by the servants to their master's guests and the assassin-like expression of their countenances and equipments, indicating the powerful lineaments left by their former habits, and intimating the prudence of observing precautions against those tendencies which might be still suspected of retaining a degree of activity.[a]

The mountainous tract which extends on the eastern limits of Ossetia towards the north, between the rivers Sunsha and Aksai is called *Kistia* or Kistetia by the Russian travellers and geographers. It is like Kabardia, a country of forests and pastures, with districts adapted to agriculture.[b] The different wild tribes that live there are known under various general names; the Georgians call them Kistes; the Tartars, Mizshegis; their principal tribe assumes the name of Ingooshes or Intooshes. We distinguish also the Tchetchentzi or Tetentzes, the Karabulaks, and the Tushes. They all speak a particular language, which appears to be very ancient. In war, they carry a buckler, and this ancient custom distinguishes them from all the other inhabitants of Caucasus.

Among the Ingooshes, we observe vestiges of the true religion. An anchoret called the Zannistag, living in celibacy, and dwelling by the side of an ancient church, performs the functions of priest; before a numerous assembly he immolates on an altar of stone a number of white sheep, which the richest and most distinguished families provide. This church, situated in the territory of the Ingooshes, bears a Gothic inscription, and contains some Latin books, ornamented with blue, black, and gilt characters; these books are revered as relics. Thirty little dwellings for hermits are erected in the vicinity of this ancient edifice, which has been always held as an inviolable sanctuary in the midst of the wars in which these barbarians are continually engaged.

The Ingooshes have a very characteristic physiognomy, and a pronunciation so extremely harsh that a stranger would think they were rolling pebbles in their mouths. They can muster 5000 men capable of bearing arms. The Karabulaks deserve to be noticed on account of their dialect, which appears to be that of the celebrated Alans; for the town of Theodosia, in Tauris, was called by the Alanic name Ardauda, signifying seven gods; now this word retains the same signification among the Karabulaks.[c]

The Tchetchentzi or Tetentzes inhabit seven large villages; they sometimes extend their depredations beyond the Russian frontiers, and then retire to their native mountains, where they can bid defiance to the pursuit of the Cossacks. They are considered as the most formidable of all the tribes which inhabit the innumerable rocky valleys of the eastern part of this chain. They are not only a dread to their immediate neighbours, tribes similar to themselves, but they keep the disciplined Russians continually on the alert. They are unwearied in their watch for prey, quick as lightning in attack or escape, unsparing in plunder, and murder without mercy those whom they rob, excepting Christians, from whom they expect additional plunder in the form of ransom. They initiate their youth at a very early age in their marauding expeditions; and the more bold and sanguinary they show themselves, the higher they stand in the estimation of their tribe. He who most frequently surpasses the rest in the execution of desperate and cruel enterprises, commonly becomes the leader of his brethren, and the chief of many families. They have one supreme chief, whose dignity is hereditary. He alone commands them on any enterprise of general interest, but he possesses no civil authority or jurisdiction. They have a sort of common law universally understood, which maintains an intestine regularity. When this is violated, a tribunal of their elders takes cognizance of the case, and the offender is instantly put to death, his dwelling erased, and his property given to the party injured. They were once a sort of Christians, and they still observe Easter. They now consider themselves as Mussulmans; but the establishment of a few domestic regulations is the only symptom of their connexion with the Arabian prophet.[d]

On the south-east we find the Tushes, that is to say, the *dreamers*, a name which they owe to their superstition. They are the *Tusci* of Ptolemy. They entertain a great veneration for cats. It is said that among them the father gives to his son, at the age of six or seven years, a young adult girl for a wife, and exercises himself the privileges of a husband until the boy arrives at puberty. The children which are the fruit of this union are brought up as part of the family. This strange custom existed till lately in European Russia. A small but very strong species of mule is found here, said to be the offspring of the jack-ass and the cow.

The eastern part of Caucasus, or ancient Albania, is divided into innumerable cantons, but which modern geography comprehends under two denominations, *Daghestan*, which includes all the declivities of Caucasus towards the Caspian Sea, and *Lesghistan*, containing the more elevated valleys towards Georgia, and the country of the Kistes. Lesghistan is a district liable to great variation of extent. Its limits enlarge or diminish according to the results of the wars which the robbers called Lesghians constantly wage with the other Caucasian nations.

The Lesghians, who appear to be the Legæ of the ancients,[e] have become formidable by their inveterate habits of plunder; they seize upon men and herds, and whatever else they can find in the neighbouring districts. They carry off their booty on swift horses, and break down behind them the bridges of ice and snow which cover the precipices of Caucasus. Accustomed to endure hunger and thirst, they carry with them only a

[a] Sir R. K. Porter's Travels in Georgia, Persia, &c. vol. I. p. 77.
[b] Georgi, Russia, IV. 971.
[c] Peripl. Euxin. Anonym. in Geog. Græc. Min. Rommel. on *Caucasus*, in the "Magasin Ethnographique," I. p. 90.
[d] Sir R. K. Porter's Travels, vol. I. p. 60
[e] Reineggs I. 188.

slender stock of provisions, either in leathern bottles or in goat's skins. But, when reduced to the last extremity, they draw lots among themselves, and he whom accident selects is forthwith devoured by his comrades. Their manner of living, and the pure air which they breathe upon their mountains, contribute to their extreme longevity. Just before death, the old Lesghian who has survived the perils of the field of battle, sends for his relations and his heirs, and points out to them where his gold, his silver, and his jewels, are deposited, and then dies contented. This nation possesses some mines.

In Daghestan we see the Lesghians peaceably driving their herds to a distance from the mountains, and paying a contribution for the pasturage. Their women, celebrated for their beauty, are no less distinguished for their courage. Several of the Lesghian tribes profess Mahometanism; some traces of the Christian faith may also be observed among them, but the less civilized still worship the sun, the moon, trees, and rivers.

Their language has some affinity to that of the inhabitants of Finland, but the diversity of the Lesghian dialects is very great. An attempt has been made to reduce them to the number of eight. 1. The *Awars*, and the fourteen tribes resembling them, which occupy the northern part of Lesghistan, speak the first dialect. The district of Awar, or Aor, so named from the Aorsi, and the original seat of the celebrated Avars, bears also the name of Chunsag, which signifies, the empire of the Chuni, or Huns. About 1500 Mahometan families live here very peaceably, under the government of a khan, who is reckoned one of the most powerful princes of Caucasus, and whose abode is distinguished from the rest by having glass windows. 2. The tribes of *Dido* and of *Unso* speak the second dialect: they dwell in the mountains above the district of the Tchares; pasture their sheep in Kacheti, and live in a state of happy indolence. 3. The third dialect is that of the *Kabutches*, who are said to dwell near the Didos, towards the east. 4. The fourth is in use among the *Andys*, who, according to Guldenstedt, inhabit a country situated on a branch of the river Koisu. 5. The *Akooshes*, the *Kooveshes*, and the *Zudacars*, three tribes whose dwellings extend along the frontier of Daghestan, and even within that province, speak the fifth dialect. The Kooveshes or Kubashes, are the most deserving of notice. They enjoy a considerable degree of independence, and are industrious, sober, honest, and loyal. It is said that they call themselves Frenks, and claim a European origin. It might have been supposed that they were the descendants of some Venetians or Genoese, who in the 15th century visited the coast of the Black Sea, had not more accurate researches proved that their language resembles that of the Lesghians. The Kubashes act as brokers in the trade which is carried on between Persia and Russia. They bring to Kisliar considerable quantities of cotton.[a] At home they are employed in the manufacture of iron, gold, and silver—in forging cuirasses—and in making fine handerchiefs, mantles of felt, and carpets. Their women are active, ingenious, and even well-informed, and occupy themselves with embroidering. The Kubashes banish from their country all idle persons and beggars. Their integrity is so generally known that the Lesghian princes deposite with them the treasures which they have accumulated, and the neighbouring tribes submit all controversies to their arbitration. They are Mahometans, but confine themselves to one wife. Twelve of their deans are entrusted with the keeping of a capital stock, which is the produce of their common labour. 6. The Kasikumuks, shepherds and marauders, who live upon a branch of the river Koisu, speak the sixth Lesghian dialect. 7. The seventh is current among the *Kaïdaks*, and the Karakaidaks, who inhabit the districts lying between the towns of Tarku and Derbend. These people are remarkably swift, and uncommonly dexterous in handling the musket and the sabre. The fertile valleys of the Kaïdaks contain many beautiful villages. The prince of the Kaïdaks is called the Uzmey; his son, it is alleged, is suckled by all the women of the country, for the purpose no doubt of strengthening their attachment to their future sovereign. 8. The *Karaëles*, who possess some villages near Tabasseran, a flourishing district, governed by a prince of its own, speak the eighth Lesghian dialect, which is believed to be also common to the inhabitants of that district.

Eastern Caucasus contains also two Tartar nations. The *Kumuks* reside in the north of Daghestan, upon the borders of the Caspian Sea. About twelve hundred families, under the government of Beys, dwell here in cabins made of hurdles of osiers. The *Truchmenes* are spread over all the eastern side of Caucasus, but principally in the south of Daghestan, and in the whole of the province of Shirwan. These wanderers speak the Turkish dialect of the Tartar language. They are governed by their hereditary khans, the most powerful of whom reside at Kooba, at Shamachie, and at Sallian.

From the state of warfare and anarchy in which these tribes live, their political topography can never be fixed. The vague word Lesghistan, or country of the Lesghians, enlarges and contracts with the invasions of that fierce people. The name Daghestan signifies a country of mountains; its application is as undetermined as that of Gorski, or inhabitants of the mountains, given by the Russians to the majority of the petty Caucasian hordes. The uncertain extent of these terms affects too the limits of Shirwan, which custom or circumstances have represented as commencing sometimes at Derbend, and sometimes at Baku.[b] Leaving these points undecided, we shall briefly notice the most remarkable places as we pass from north to south.

The country of the Kumuks extends from the banks of the Terek to those of the Koisu. It comprehends the gulf and the peninsula of Agrachanskoi. The most remarkable place is Endery, the market where the Lesghians sell their plunder. To the south of the Koisu is the territory of a Tartar chief, who assumes the title of Shamkal, and who resides in Tarku, a town containing 10,000 inhabitants, upon the shores of the Caspian Sea.[c] Ascending the Koisu, we arrive at the dominions of

[a] Guldenstedt, Voyage, &c. I. 181. Reineggs, I. 60—113. Forster, Voyage du Bengale, &c. II.

[b] Compare Busching, Géographie, II. part. 2. Georgi, Russie, II. 975. Wahl, Asie Occidentale, I. 459—482.

[c] Bieberstein, Description of the countries between the Terek and the Kur, in the "Annales des Voyages," XII. p. 180.

Ouma-Khan, or Khan of the Awares, of whom we have before spoken. The town of Chunsag contains about 600 houses. On the eastern side of the mountains, we find the interesting town of Kubasha, with its industrious population of about 6000 souls. The territory of the prince, called Uzmey, reaches to Derbend; he resides at Barshli. The town of Derbend, shut up between the mountains and the sea, reckons from 6 to 700 houses; its thick and lofty walls astonish the traveller, but oppose no barrier to the advance of armies; its insecure port has but little trade. We here begin to feel the influence of a milder climate. The territories of Derbend, Koora, and Kooba, must be reckoned among the most delightful countries. It is here that, according to Strabo, the inhabitants reaped a harvest of fifty fold, and saw these rich crops spring up twice or thrice every year. Even in our days the soil is in some places so rich and strong that six or eight oxen must be yoked to the plough. A great quantity of wheat, barley, saffron, cotton, and various fruits, is exported.[a] The territory of Kooba has been called by the Persians the Paradise of Roses. There are places where from each cleft of the rock a vine may be seen shooting out.[b] But these fine regions are subjected to excessive humidity; and are in several places infected with reptiles and pernicious insects. The towns of Tabasseran, Acouti, and others, are the chief residences of the petty sovereignties in the mountains. The khan of Koora extends his dominion to the sea, where the river Samour, probably the Albanus of the ancients, discharges its abundant waters through ten or twelve mouths. Kooba, the abode of the most powerful khan of that country, contains only about 400 or 500 houses. Below Kooba is the town of Shabran, which was built by Hebrews under the name of Samaria. Some Jews still live there, who are distinguished by their handsome persons, and their easy manners. These towns, situated on the eastern side of Caucasus, look towards the Caspian Sea. As we pass the mountains, we see, extending to the south-west and the south, the territories of Dscheki, Shamachie, Khana, and Sallian. The two first are bounded by the Kur, the other two occupy the insular plain encompassed by that river and the Aras. New Shamachie, a trading town of 5000 inhabitants, is considered as the capital of Shirwan.

The Kur, after being augmented by the junction of one of its branches with the Aras, becomes navigable. The sturgeon fisheries at its mouth, near Sallian, bring in 20,000 rubles (or L.3000) to the khan of Kooba, who lets it out to the Russians.[c] To the east of Shamachie Caucasus decreases in height. An extensive neck of land shoots into the Caspian Sea, called the Peninsula of Apsheron, or of Okoressa, whose saline and clayey soil is covered with a languishing vegetation, but whose celebrated springs of naphtha form a source of inexhaustible wealth to the petty sovereign of the town of Baku. The principal springs are at Balaghan, one of them furnishes 500 pounds a-day. Not far from thence is the *field of fire*, about a square verst in extent, and continually emitting an inflammable gas. The Guebres, or worshippers of fire, have built several small temples there. In one of these, near an altar, a large hollow pipe is fixed in the earth; from the upper end a blue flame issues more subtile than that from spirits of wine: a similar flame escapes from a horizontal opening made in the rock. A hill near Baku furnishes white naphtha, but in very limited quantities. The Russians make use of it both as a medicine and as a cordial; they apply it also externally. Not far from thence are two springs of hot water, which bubble up like the naphtha; the water is impregnated with a bluish clay, which renders it thick, but it becomes clear by standing, the clay falling to the bottom. Bathing in it braces the system, and improves the appetite. The khan of Baku derives from the naphtha a revenue of 14,000 rubles, (or L.2100.) The town of Baku, which has a road for ships by no means safe, though the best upon the coast, exports to Russia, besides naphtha, some cotton, rice, and a small quantity of wine and opium. Its territory also supplies salt, which is obtained from several lakes or salt marshes.

Such are the principal nations, countries, and towns, of the Caucasian region; in surveying which we have unavoidably been somewhat prolix, from the number and the minuteness of the objects to be described.

Table of the Geographical Positions of the Caucasian Region.

Names of places.	Long. E. from London.			Latitude.			Authorities.
	deg.	min.	sec.	deg.	min.	sec.	
Derbend .	47	39	15	42	5	45	Russian Atlas in 100 sheets.
Kislar . .	46	14	15	43	51	15	Idem.
				(43	54	0)	Calendar of Petersburgh.
Mosdok .	43	50	15	43	43	46	Russian Atlas.
Taman . .	36	35	0	45	12	16	Id. Archives of Lichtenstern.
Tiflis . .	44	20	15	41	28	30	Idem.

Note. The Table annexed to the Russian Atlas is founded on Astronomical observations, chiefly recent.

Synoptical Table of the Political Divisions of the Caucasian Countries.

Great Divisions.	Subdivisions.	Capitals.	Sovereigns.
Caucasia, (government of,)	1. Circle of Gregoriewsk. .	Gregoriewsk, or Yegoriewsk .	Russia.
	2. — of Alexandrow.		
	3. — of Kizliar.		
	4. — of Stauropol.		
	5. — of Mozdok.		
Country of the Cossacks of the Black Sea.	Makes a part of the government of Taurida. . .	Ekaterinodar.	Idem.
Circassia	1. Circassia of the Kuban. .	None. . .	Independent.
	2. Great Kabarda.		
	3. Little Kabarda.		
Abassia .	Different cantons.	None. . .	Under the protection of Turkey.
Western Georgia, formerly Turkish Georgia.	1. Mingrelia. . . Odischi, canton.	Isgaour. .	A czar, a vassal of Russia.
	2. Imeritia. . . Kadsha, canton.	Kutatis. .	A prince, vassal of Russia.
	3. Guria. . . .	Titizigha (?)	Dependent on the Turks.

[a] Gmelin's Travels, III. 68. Bieberstein, Description of the Countries between the Terek and the Kur, p. 31, (in German.)

[b] Reineggs, I. p. 107.

[c] Georgi. II. 977. Compare Bieberstein, &c.

Continuation of the Synoptic Table of the Political Divisions of the Caucasian Countries.

Great Divisions.	Subdivisions.	Capitals.	Sovereigns.
Eastern Georgia, formerly Persian Georgia.	1. Circle of Tiflis.	Tiflis. . .	Russia.
	2. — of Gori.		
	3. — of Ananur.		
	4. — of Tela.		
	5. — of Sihnah.		
	6. — of Adjakala.		
	Formerly divided into Kartueli and Kacheti.		
Gorski, or people of the mountains.	1. Suanetia. . .	None. . .	Princes or *elders*, most of them dependents on Russia.
	2. Basiania.		
	3. Ossetia.		
	4. Kistia, or Ingooshia.		
	5. Tchetchentzia.		
Lesghistan.	1. Khanat of Awar.	Chunsag, or Awar, (according to others, Kabudana.)	Independent khan.
	2. Lordships of the Kazikumuks. .	Kasamish, Kumuk. .	Various chiefs.
	3. The cantons of Tchari, Tushes, &c.	None. . .	Various chiefs.

Great Divisions.	Subdivisions.	Capitals.	Sovereigns.
Daghestan.	1. Country of the Kumuks.	Endery, &c.	Princes dependent on Russia.
	2. Khanat of Tarku.	Tarku. . .	Khan dependent on Russia (the Shamkal.)
	3. — of Kaïdak. .	Kaïdak, Barshli. . .	Idem (the Uzmey.)
	4. District of Kubascha.	Kubasha. .	Dependent on the khan of Kaïdak.
	5. — of Akusha. .	Akusha. .	Idem.
	6. — of Derbend. .	Derbend. .	Russia (1809.)
	7. — of Koora. . .	Koora. .	Dependent on the Russians, but formerly on the Persians.
	8. — of Kooba. . .	Kooba or Kuba. . .	Idem.
Shirwan. .	1. Khanat of Baku.	Baku . .	Idem.
	2. — of Shamachie.	Shamachie.	Idem.
	3. — of Dscheki or Kaballa. . .	Nuchi. . .	Idem.
	4. Lordship of Sallian.	Sallian. .	Khan of Kuba.

Note. The extent and population are uncertain.

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BOOK XXVI.

TURKEY IN ASIA.

PART I.

Asia Minor, with the Coasts of the Black Sea.

We are now to tread upon a soil rich in interesting and splendid recollections, with an existing population completely debased by ignorance and slavery.

The glory of twenty different nations which once flourished in Western Asia has been extinguished; flocks wander over the tomb of Achilles and of Hector; and the thrones of Mithridates and Antiochus have disappeared, as well as the palaces of Priam and Crœsus. The merchants of Smyrna do not inquire whether Homer was born within their walls; the fine sky of Ionia no longer inspires either painters or poets; the same obscurity covers with its shades the banks of the Jordan and the Euphrates; the republic of Moses is not to be found; the harps of David and Isaiah are now silent for ever:—the wandering Arabian comes, indifferent and unmoved, to rest the poles of his tent against the shattered columns of Palmyra; Babylon also has fallen beneath the stroke of an avenging destiny, and that city which reigned supreme over oppressed Asia has scarcely left behind it a trace that can show where the ramparts of Semiramis were raised. "I have seen on the spot," says a traveller, "the accomplishment of that prophecy: 'Tyre, the queen of the nations, shall be made like the top of a rock, where the fishermen shall spread their nets.'"[a] If, however, European arts and civilization were, by some new arrangement of Providence, to revisit this ancient cradle of the human race, we should still find there the charming coast of Ionia, with its picturesque islands; the fertile shores of the Euxine, shaded by inexhaustible forests; and in the distance the numerous chains of Mount Taurus, crowned with upland plains, representing on a small scale the vast plateaus of central Asia. We should still see the Euphrates and the Tigris bearing the ice of Armenia towards the burning plains of Mesopotamia; and, seated under the shade of the cedars of Lebanon, our eyes could wander over the orchards and meadows of Damascus. The population only has undergone a change; nature remains essentially the same. In describing these countries we must therefore be permitted, from the ignorance of the inhabitants, and the imperfect accounts of travellers, to avail ourselves of the precious records that have been left by the ancients. We have already, on the authority of Strabo, exhibited a very complete view of the ancient geography of those regions. Strabo will still serve as our guide while we bring together the detached elements of which their modern geography is composed. But, to enable our readers the better to enjoy a view so complex and extensive, we shall separate it into its principal groupes, and shall in the present book confine our attention to the peninsula of Asia Minor, along with the coast of the Euxine Sea.

The mountains of Taurus, according to all the descriptions of the ancients, extended from the frontiers of India to the Ægean Sea. Their principal chain, as it shot out from Mount Imaus near the sources of the Indus, wound like an immense serpent, between the Caspian Sea and the Euxine on one side, and the sources of the Euphrates on the other.[b] Caucasus seems to have formed part of this line according to Pliny; but Strabo, who was better informed, traces the principal chain of Taurus between the basins of the Euphrates and the Araxes, observing that a detached chain of Caucasus, that of the Moschic mountains, runs in a southern direction, and joins the chain of Taurus.[c] Modern accounts represent this junction as not very marked.[d] Strabo, who was born on the spot, and who had travelled as far as Armenia, considers the entire centre of Asia Minor, together with all Armenia, Media, and Gordyène, or Koordistan, as a very elevated country, crowned with several chains of mountains, all of which are so closely joined together, that they may be regarded as one. "Armenia and Media," says he, "are situated upon Taurus." This plateau seems also to comprehend Koordistan, and the branches which it sends out extend into Persia, as far as the great desert of Kerman on one side, and the sources of the Gihon and the Indus on the other. By thus considering the vast Taurus of the ancients as a *plateau*, and not as a chain, the testimonies of Strabo and Pliny may be reconciled with the accounts of modern travellers.

Two chains of mountains are detached from the plateau of Armenia to enter the peninsula of Asia Minor; the one first confines and then crosses the channel of the Euphrates near Samosata; the other borders the Euxine, leaving only narrow plains between it and that sea.[e] These two chains, one of which is in part the Anti-Taurus, and the other the Paryadres of the ancients, and the Tcheldir or Keldir of the moderns, are united to the west of the Euphrates, between the towns

[a] Ezekiel xxvi. 4, 5.
[b] Pliny, Lib. V. cap. 27.
[c] Strabo, XI. 342. edit. Atrebat. 1587.
[d] Map of Caucasus by M. Lapie. Annales des Voyages, vol. XII.
[e] Strabo, XII. p. 378. M. Fourcade, Consul General at Sinope MS. notes.

of Siwas, Tocat, and Kaisaria, by the chain of Argæus, now named Argis-Dag, whose summit is covered with perpetual snows,[a] a circumstance which, under so low a latitude, shows an elevation of from 9 to 10,000 feet.[b] The centre of Asia Minor resembles a terrace supported on all sides by chains of mountains. Here we find salt marshes, and rivers which have no outlets. It contains a number of small plateaus, one of which Strabo has described under the name of the plain of Bagaudené. "The cold there," says he, "prevents the fruit trees from thriving, whilst olive-trees grow near Sinope, which is 3000 stadia more to the north."[c] Modern travellers have also found very extensive elevated plains throughout the interior of Asia Minor, either in the south, towards Konieh,[d] or in the north, towards Angora.[e] But all the borders of this plateau constitute so many chains of mountains, which sometimes encircle the plateau, and sometimes extend across the lower plains.

The chain which, breaking off both from mount Argæus and from Anti-Taurus, bounds the ancient Cilicia to the north, is more particularly known by the name of Taurus, a name which in several languages appears to have one common root, and simply signifies *mountain*. The elevation of this chain must be considerable, since Cicero affirms that it was impassable to armies before the month of June on account of the snow.[f] Diodorus details the frightful ravines and precipices which it is necessary to cross in going from Cilicia into Cappadocia.[g] Modern travellers who have crossed this chain, now called Ala-Dagh, farther to the westward, represent it as similar to that of the Apeninnes and Mount Hemus.[h] It sends off to the west several branches, some of which terminate on the shores of the Mediterranean, as the Cragus, and the Masicystes of the ancients, in Lycia; others, greatly inferior in elevation, extend to the coasts of the Archipelago opposite the islands of Cos and Rhodes. To the east, Mount Amanus, now the Almadagh, a detached branch of the Taurus, separates Cilicia from Syria, having only two narrow passes, the one towards the Euphrates, the other close by the sea;[i] the first answers to the Amanian defiles (Pylæ Amanicæ) of the ancients, the other to the defiles of Syria. The latter, with their perpendicular and peaked rocks, are the only ones that have been visited by modern travellers.

Two other chains of mountains are sent off from the western part of the central plateau. The one is the Baba-Dagh of the moderns, which formed the *Tmolus*, the *Messogis*, and the *Sipylus* of the ancients, and which terminates towards the islands of Samos and Chios; the other, extending in a north-west direction, presents more elevated summits, among which are the celebrated Ida and Olympus (of Mysia.) Lastly, the northern side of the plateau is propelled towards the Black Sea, and gives rise to the chain of the Olgassys, now Elkas-Dagh, a chain which fills with its branches all the space between the Sangarius and the Halys. The summits retain their snow until August.[k] Throughout the ranges of mountains which we have just described, limestone rocks appear to predominate. The ancients highly extol the marbles of Asia Minor, but from the Sangarius to the Halys we meet with nothing but granite rocks. Earthquakes have often ravaged this fine peninsula; thirteen cities were destroyed in one day in the reign of Tiberius. The ancients distinguished one district as remarkably abounding in traces of volcanic eruptions; the district called Katakekauméné, that is, the burnt country, "where very often the earth emitted flames, and where the vine grew on a soil entirely composed of ashes." This focus of the volcanic shocks which Anatolia so frequently experiences, ought to lie to the east of Thyatira. Modern travellers have not visited it.

The peninsula of Asia Minor contains only rivers of inconsiderable size, though very celebrated. Those which run south towards the Mediterranean are the shortest and the most rapid. The Pyramus in Cilicia, now called the Seihoun, as it crosses the chain of Taurus, passes through a narrow defile, the angles on the opposite sides of which so exactly correspond, as to resemble a work of art.[l] The Ægean Sea receives more considerable rivers; among these may be distinguished the winding Meander, now Meinder, a deep but narrow river,[m] which often undermines its banks. This in former times gave rise to a singular custom; the proprietors who suffered from these ravages, instituted a process against the river, and received indemnity from the toll established along its course. We must also notice the Pactolus and the Hermus, which rolled down grains of gold, but which even in the time of Strabo were neglected; lastly, the Simois and the Scamander, immortalized by the author of the Iliad. The largest rivers of Asia Minor flow into the Black Sea; the Sankara or the Aiala of the Turks[n] is the Sangarius of the ancients; the Bartin or Parthenius still flows as in the days of Strabo, between flowery meadows and smiling slopes. The Halys, now the Kisil-Irmak, the southern branch of which Pliny alone has distinctly pointed out, when he represents it as taking its rise from the base of the Taurus in Cilicia, and directing its course from south to north, appeared to Tournefort, who saw it near its mouth, to be as wide as the Seine at Paris.[o] It has only one mouth, although modern maps give it several.[p] The Jekil-Irmak or the Iris, is the next in size to the Halys; but the other rivers that fall into the Euxine Sea are remarkable only for the rapidity of their course.

Asia Minor contains a great many lakes which are destitute of outlets, and the waters of which are more or less impregnated with salt. Ancient geography has

[a] Strabo, XII. Paul Lucas, deuxième voyage, I. 137. Hadgi-Khalfah, Turkish Geography, MS. translation, (French,) p. 1772.
[b] Fr. measure; about 9600 to 10,700 feet Eng.
[c] Strabo, II. p. 50.
[d] Olivier, Voyage dans l'Empire Ottoman, VI. 388, 399, 401.
[e] Tournefort, Lettre XXI. Paul Lucas, deuxième voyage, I. c. 21.
[f] Cicero, Epist. ad Famil. XV. 4, &c.
[g] Diod. XIV. 20. Herodian, &c.
[h] Paul Lucas, deuxième Voyage, I. 35. trois. Voyage, I. p. 184.
[i] Xenophon, Cyri. exped. I. 4. Arrian, &c. &c. Otter's Travels, I. p. 82, (in German.) Pococke, II. p. 257, (Idem.)
[k] M. Fourcade, manuscript notes.
[l] Strabo, XIII, 809. Almel.
[m] Nicetas Chroniates, p. 125, (Corp. Byz.) Tit. Liv. XXXVIII 13.
[n] Pliny, VI. 2.
[o] Tournefort, Let. 21.
[p] M. Fourcade, notes MSS.

partially informed us of their existence, and modern accounts do not lead us to believe that the information is beyond the truth.

The lake Tazla, which is about thirty miles in length, presents a vast plain covered with crystals of salt.[a] That of Akshehr is upon the same plateau. In passing the most elevated ridge of Taurus, another plateau, near Beysheri, contains two extensive lakes, the waters of which are bitter and saponaceous.[b]

Both the ancients and moderns are loud in praise of the climate of Asia Minor; it enjoys a mildness of temperature which is not experienced on the European side of the Archipelago. The heat of summer is greatly moderated by the numerous chains of high mountains; and the vicinity of three seas diminishes the intensity of the colder season. It is unquestionably to this happy region, that what Hippocrates[c] has said of Asia in general peculiarly applies: "There is scarcely any variation of heat and cold known here, the two temperatures are so delightfully blended together." The southern coasts, however, are liable to oppressive heats, while the shores of the Black Sea experience occasionally an excess of moisture.

The ancients were better acquainted with the riches of Asia Minor than we are.[d] The moderns, however, give a very brilliant, though incomplete description of them. The coasts of this peninsula furnish nearly the same productions as Southern Greece; olive, orange, myrtle, laurel, turpentine, mastic, and tamarind trees adorn the sinuous banks of the Meander, and the delightful shores of Scio and of Rhodes. Whilst the wild vine climbs to the summits of the trees, hanging in graceful festoons, and forming a thousand little verdant grottos, the plane spreads with greater majesty its vast shade over a soil bestrewed with odoriferous flowers. Even the cold heights of Taurus are crowned with cypress, juniper, and savin trees. The *quercus infectoria*, the oak which produces the gall nuts used for dying is met with every where from the Bosphorus to Syria, and to the frontiers of Persia.[e]

There are vast plains in the interior, which produce only saline plants, or wormwood and sage.[f] Often by the side of dreary salt marshes there are other plains less moist, which derive their verdure entirely from two kinds of broom, the *spartium junceum* and *spinosum;* asses and sheep feed now, as formerly, in these barren regions.[g] Some of the mountainous districts towards the east contain subterranean fires, while the neighbouring soil is inundated with cold and stagnant water. Upon the banks of the river Euphrates, vines, olives and all kinds of fruit trees again make their appearance. The burning coasts of Caramania partake of the vegetation of maritime Syria. Rich gums exude from the trees, among which is the styrax which yields the ladanum.[h] The ancients procured from hence their wood for ship building. Other forests and other plants cover the shores of the Black Sea; there oaks and fir predominate. This coast is the orchard of Constantinople and Cherson There are entire woods of hazel-nut, apricot, and plum trees, and, still more abundantly, of cherry trees.—This last owes its name to the city of Cerasus. The plains which border the Halys, the Sangarius, and the Meander, afford very rich pasture.

We know very little of the domestic animals of Asia Minor: some authors allege that they are now inferior to those of Europe. The beef is scarce and indifferent; the mutton somewhat better. Kid's flesh is esteemed a delicate food. The horses, which are very strong and fleet, seem to be descended from the ancient Cappadocian breed. The goats of Angora are distinguished for the length and fineness of their hair, as are also the cats of that district. The antelopes of Syria sometimes stray beyond Mount Taurus, and may then meet the Ibex which comes from the heights of Caucasus. Their great enemies are the jackalls, wolves, hyenas, and bears; but it is very doubtful whether the lion is still to be seen in Asia Minor. Swans continue to frequent the banks of the Caÿster. Red partridges cover the coasts of the Hellespont; all kinds of game abound in this half cultivated country; upon Mount Taurus there are wild sheep.[i]

The copper mines of Tocat, that of Koureh, near Kastamouni, and that of Gumish-Khana, not far from Trebisond, are still celebrated. All the chains in the neighbourhood of the Black Sea exhibit indications of excellent copper. But they no longer work the cinnabar of Mount Olgassys, the gold of Lydia, the rock crystal of Pontus, nor the valuable alabaster and the coral marble of the central provinces. We know less than the ancients of the mineralogy of this wide country. It is in Strabo that we must look for the description of the Corycian cavern, a romantic grotto of Cilicia; the spot near Hephestion in Lycia, whence issued an inflammable gas; the petrifying springs of Hierapolis, and many other natural curiosities. We have noticed these in our analysis of the geography of this writer;[k] for, in the absence of all information from travellers, how could we affirm that all these remarkable objects still exist in the same state? It is, however, probable that they do.[l] Chandler confirms the accounts of Strabo concerning the hot springs of Hierapolis or Pambouk; he found a mass of rock formed by the tufa or soft sand-stone which these waters deposite; it resembles an immense cascade which has been suddenly frozen or converted into stone. Near the same place is the celebrated cave whose pernicious exhalations were remarked by the ancients.

We shall now describe the principal places of this tract of country, of which we have been giving a general sketch. We shall set out from the banks of the rapid and violent Tcharuk, or Batoum, which is the Akampsis of Arrian, and the Absarus of Ptolemy.[m] It forms the

[a] Taverneir, vol. I. b. I. ch. 7. Pococke, III. 134.
[b] Paul Lucas, deuxième Voyage, Vol. I. c. 33. trois. Voyage, T. I. p. 172.
[c] Hippoc. de Aere, aqua, et locis.
[d] Strabo, B. XII. XIII. XIV.
[e] Olivier, I. p. 253.
[f] P. Belon, Observations, &c. CXII.
[g] Strabo, B. XII, passim. Pliny, XVI. c. 37, XIX. c. I. &c.
[h] The *ladanum* exudes from the *Cistus creticus*. The *Styrax officinalis* furnishes the *Storax*, a balsam.—P.
[i] Hadgi-Khalfah, p. 1753-1773, &c.
[k] See the volume containing the history of Geography; the volume first of the original work, and intended to be the last of the present translation.
[l] Chandler's Travels in Asia Minor.
[m] Mannert, Geographie des Grecs et des Romains, V. p. II. p. 362. *sqq*

boundary of the pashalick of Tarabosan or Trebisond. The first Turkish town on this side which is worthy of notice, is Rizé. It exports a great quantity of linen, manufactured copper, and fruits. Of and Surmineh enjoy a share of this commerce. Then comes the celebrated city of Trebisond, which the Turks name Tarabosan. It is the ancient Trapezus, built by a colony of Greeks from Sinope. It is mentioned by Xenophon, in his retreat of the ten thousand. It acquired importance under Trajan, and still more under Justinian.[a] It was afterwards the capital of an empire founded by a branch of the Comnenuses of Constantinople, who were dispossessed of it in 1452 by Mahomet II. Although it has lost its ancient splendour, it is still considerable, and contains from 20 to 30,000 inhabitants; but the Greeks are now emigrating from it. The articles of exportation are copper from the mines of Gumishkhané, wax, leather, fruits, and a little wine.[b] Two bays on the coast present to us successively Traboli and Kerasount, which carry on the same commerce as Trebisond. Their territories produce a little silk. The inhabitants of Unieh, the ancient Œnoe, occupying a barren territory, which however produces the fine rock alum of Kahissar, carry on a coasting trade either with the Russian ports, or with those of the Abassians. The ancient Amisus, one of the residences of Mithridates the Great, is now a small town, named Samsoun. It has a haven for ships, whence are exported the copper of Tocat, silks and fruits, the linen of Amasia, and even the cottons of Adana, which are carried into the Crimea.[c] Going up the river, now named Jekil-Irmak, and anciently the Iris, we meet with Amasia, a town interesting to the geographer, being the birth-place of Strabo. It is situated among steep rocks, but the environs produce excellent fruit and good wine.[d] More to the south, in a deep valley, is the city of Tocat, containing 40,000 inhabitants, and surrounded with orchards and vineyards.[e] The buildings are two stories high, and each house has its fountain; the streets are well paved, a very rare thing in that country. There is a manufacture of blue morocco; but the trade is principally in silk, of which a great many stuffs are made, copper utensils, and printed calicoes, which are brought from Bassora by the caravans. Tocat is the ancient Comana Pontica: it is dependant upon the pashalick of Siwas. The town of Zile, anciently Zela, like some others in Pontus, is situated upon an artificial hill.[f]

The mountains which extend from Tocat towards Trebisonde, where they separate the basin of the Euxine sea from that of the Euphrates, support in their verdant valleys, shaded with forests of chestnut trees, several tribes of wandering Kurds,[g] whose pastoral life reminds us of those ancient hordes which Xenophon and Strabo place in these countries, and of which they are probably the remains. The name of the ancient Thianni or Tzani, is preserved in that of the canton of Dshianik. The mountains in the interior of this canton have, on their summits, rings of iron, to which the inhabitants say the cables of vessels were attached at the time when the Black Sea, from the want of an outlet, stood at that high level.[h] The ingenuity of the ancient Chalybes or Chaldæi, in working metals, continues to distinguish the natives of the mountainous region, which still retains the name of Tcheldir, or Keldir.

Passing the river Halys, we enter the district, or *mousselimat* of Kastamouni, which corresponds to the ancient maritime Paphlagonia. The city of Kastamouni or Kastambol, though inhabited by Turks, has several manufactures flourishing within its walls, particularly that of copper utensils. The population amounts to about 50,000 souls.[i] The ancient Pompeïopolis, for a long time the capital of this country, has lately been discovered in the present town of Tasch-Kouprou.[k] The coast from the Halys to the Bosphorus has long been incorrectly delineated on the maps. The observations of M. Beauchamp, have at last nearly determined its true bearings. The supposed gulf of Samsoun has disappeared, and the coast in general extends an entire degree farther to the north than the charts of d'Anville represent.

Before we arrive at Cape Karampé, the most northern point of Asia Minor, we find the celebrated town of Sinopé, situated upon an isthmus, sheltered from the north by a peninsula: on the east there is an excellent road for ships, with timber yards for the imperial Turkish navy. This town, which the emigrations of the Greeks have reduced to a population of 5000 souls, exports rice, fruits, skins, and planks: the trade in fish, at one time immense, is now very inconsiderable. Inehboli is the seaport of Kastamouni: it exports building timber, copper, and hemp. Amastro, the ancient Amastris, and Erekli, or Heraclea, have preserved nothing but an illustrious name.

The Bosphorus opens before us like a majestic river, having its banks adorned with villages, castles, and country-seats. At the termination of this strait stands Scutari, which, with a population of 30,000 inhabitants, would be considered a large and fine city, were it not situated opposite to Constantinople. Upon the first gulf of the Propontis, we find the port belonging to the town of Isnikmid, that is, the ancient Nicomedia in Bithynia, where the Emperor Constantine died: it is still a considerable place. This is more than can be said of Isnik, the ancient Nicæa, celebrated as the meeting place of the first general council; but now reduced to two or three hundred houses, inhabited solely by Jews, who manufacture earthen ware or sell silk. The Propontis is surrounded with celebrated ruins, among which those of Cyzicus still bear testimony to the grandeur and magnificence of one of the first commercial cities in ancient times.[l] Here the heights of Mount Olympus, covered with snow till the middle of summer, naturally arrest our attention. At the foot of this natural pyramid stands the city of Boorsa, Broosa, or

[a] Eustath. ad Dionys. Perieg. V. 687. Notit. Imp. c. 27. Procop. de Ædificiis, III. 7.
[b] M. Fourcade, notes manuscrites. Compare Peyssonel and Tournefort.
[c] M. Fourcade, notes manuscrites.
[d] Strabo, XII. p. 839. Almel. Tavernier, I. c. I. p. 9.
[e] Jackson in Sprengel, Library of Travels, (in German,) VIII. p. 144.
[f] Tavernier, I. c. 7. p. 102.
[g] Tournefort, Voyage, Lett. XXI. p. 175.
[h] Hadgi-Khalfah, p. 1798.
[i] M. Fourcade, Memoire sur Kastamouni.
[k] Id. Memoire sur Pompeïopolis, Annales des Voyages, XIV.
[l] Paul Lucas, second Voyage, I. c. 4. Pococke part III. vol. II. c. 23.

Prusa, which owes its origin to Hannibal,[a] and which was the capital of the Ottoman Empire, previously to the taking of Constantinople. It is still one of the most beautiful cities in the empire, situated in a fertile and finely wooded plain, inclosed within the immense ridges of Olympus.[b] The most skilful artisans of the Turks reside here, and the satins and tapestry of this town are highly valued. The fine silk, which is obtained there in large quantities, is insufficient to employ the manufactories established in the town: the deficiency is supplied from Persia. The city of Bursa, properly so called, occupies an eminence which commands a fertile plain, abounding in hot springs. This city, inhabited by about 50,000 souls, contains 140 mosques, two of which are magnificent, and it is adorned with a prodigious number of fountains. Bursa has for its sea-port Montagna, commonly called Moudania, from whence it exports a great quantity of saltpetre, white wine, and fruits, and a variety of manufactured goods.

We come now to the central parts of Asia Minor, which have been long infested by troops of Turcomans. Of late, however, a kind of order, or at least of calm, has arisen from anarchy itself; two great feudatory families, that of Kara-Osman-Oglou, and that of Tchapan-Oglou, after having successively acquired vast dominions in Asia Minor, have re-established tranquillity by substituting their own authority in the room of that of the Porte, whose supremacy they recognise no farther than their own interests happen to require. The states of Kara-Osman, or the Prince of the Valleys,[c] comprehend ancient Mysia, Lydia, and a part of Bithynia; they extend from the Sangarius to the Meander. The domains of Tchapan-Oglou comprise Galatia and Paphlagonia, or the country between the Sangarius and the Iris. The territories of the pasha, or beglerbeg of Anatolia, residing at Kutaïeh, are nearly confined to ancient Phrygia.

The route from Broosa through Kutaïeh and Konieh in Caramania traverses chiefly the plateau of salt lakes destitute of outlet, of which we have already spoken. Kutaïeh, the ancient Cotyæum, is a considerable town, embellished with mosques, caravanseras, and baths, and surrounded with gardens, vineyards, and walks. It contains more than 10,000 houses, and probably more than 50,000 inhabitants. The town is built on the side of a hill; the houses are handsome, and the castle, occupying the position of Cotyæum, appears to have been a place of great strength.[d] Its fertile territory produces excellent fruit, and abundance of gall nuts.[e] Kara Hissar, famous for its trade in opium, and its manufacture of black felt, is a subject of dispute among geographers; one of the most learned of them has lately asserted that it was the ancient Celænæ.[f] Aksheer, a considerable town, answers, according to d'Anville, to the ancient Antiochia ad Pisidiam; and according to Mannert, to Tyriæum; the neighbouring mountain being to the west, while the plain, fertile in corn and fruits, lies to the east.[g] The opinion of the German author appears to merit the preference. Konieh, the ancient Iconium, is now the residence of a pasha, who commands the northern part of Caramania, a province in which are comprehended ancient Pamphylia, Pisidia, Lycaonia, the greater part of Cappadocia, and Cilicia. This town, important when it was the residence of the sultans of Roum, now reckons only from 15,000 to 20,000 inhabitants. Here a number of antique materials are formed into modern edifices. A small river loses itself among the gardens which surround the town. To the east are extensive marshes.[h] The town of Caraman, which has given its name to the province, is not far from the source of the southern branch of the Halys. It is a mean looking place, but still covers an extensive area, and contains 3000 families occupied in the cotton manufacture.

In descending this branch of the Halys, in order to approach Angora, we should examine whether Akserai is the ancient Archelaïs; whether Kirshehr, at the confluence of the Erkurus, corresponds to Nazianzus, surnamed Dio-Cæsarea; whether the river Chaux, upon which is now situate the town of Nikidé, is the Cappadox of Pliny: but this route being little frequented, these questions will probably remain long undetermined.

A road which is better known will conduct us from Broosa, or from Nicæa, to Tocat, through the flourishing states of Tchapan-Oglou, which begin at Beibazar, a town situated upon the river Sangarius. As we advance to the east, in a very elevated plain, we discover Angora. It is to the fineness of the hair of its goats that this city is indebted for its fame and its wealth. It is supposed to contain a population of 80,000 souls. (Dr. Pococke made them 100,000; Mr. Kinnear only 20,000.) The inhabitants are milder, and are better governed than in any other town of Natolia. They are chiefly Armenians. The streets are wide, and paved with blocks of granite. Some fine remains of antiquity are to be seen, among others, the celebrated temple in honour of the Emperor Augustus, from whose reign the greatness of the city may be dated. Half way between Angora and Tocat lies the town Ieuzgatt, the residence of Tchapàn Oglou, which, though lately in ruins, is seen daily assuming a finer and more populous appearance.[i]

Ascending the eastern branch of the Kisil-Irmak, the branch which answers to the Halys of Herodotus and Strabo, we arrive at Siwas, the ancient Sebastia, (in Pontus,) now the residence of a pasha, whose dominions extend, if not *de facto*, at least *de jure*, over all the countries between the Euphrates and Mount Argæus, as far north as the banks of the Iris. Some modern travellers[k] assert that Siwas contains 1000 houses, others 4000; how then can geographical writers be expected to agree? It is a dirty ill-built place. The pashalick of Siwas has, by a caprice of fortune, retained the sounding name of Room, or the country of the Romans.

The basin of the eastern Halys touches on the south side that in which flows the Karasou, that is, the Black

[a] Pliny, V. 22. (notwithstanding Strabo, &c.)
[b] Kinnear's Travels in Asia Minor.
[c] In Turkish, Dairéh-Beg, according to Seetzen.
[d] Kinnear's Travels, or Murray's Historical Account of Travels in Asia, Vol. III. p. 178.
[e] Olivier, Voyage dans l'Empire Ottoman, VI. p. 408, (in 8vo.)
[f] Mannert, Geographie des Grecs et Romains, V. part iii. p. 119-125. Compare Pococke, &c.
[g] Olivier, VI. 396.
[h] Abulfeda, Busching's Geographical Magazine, V. 307. Otter's Travels in Turkey, I. c. 7.
[i] Itinéraires Manuscrits de Messrs. Trezel, Favier, &c.
[k] M. de Gardane, Journal, &c. p. 113. M. Trezel, Itineraires manuscrits.

River, the Melas of the ancients. At the head of this valley may be seen Kaisariéh, the ancient Cesarea, the capital of Cappadocia, a large town situated at the base of Mount Ardehis. A traveller, who has been undeservedly decried, found in the environs of this town all the mountains perforated with grottos, which probably served as summer residences to the ancient inhabitants of the country.[a] Such abodes were common to many nations. It is more difficult implicitly to admit the statement of this traveller concerning the 200,000 little pyramids, each having doors and windows, which he assures us are to be seen not far from Cesarea near Yrkup. But must we entirely reject whatever exhibits the appearance of the marvellous? It contains 25,000 inhabitants, and has a considerable trade in cotton, which is produced abundantly in its neighbourhood.

The country along the banks of the Melas furnishes the wandering hordes of the Turcomans with scanty pasturage. The villages appear like Oases in a desert. But as we approach the Euphrates, the eye delights to repose on the gardens, the orchards, and the groves of poplars, which surround Malatiah, the ancient Melitene, a town containing from 1200 to 1500 houses.[b] It was the principal town of the Lesser Armenia; a country through which, in the middle ages, the great commercial road from Europe to India passed,[c] and which, in modern times, has been traversed from south to north by not more than two travellers.[d] It may therefore be reckoned almost a *terra incognita*. We know that in going from Malatiah to Ayas, the ancient Issus, we pass through a small province, named by the Turks Dulgadir Ili, and governed by a pasha, who resides at Merasche; but whilst d'Anville places that town to the south-west of Mount Amanus, wishing to identify it with the ancient Germanicia, an eye-witness represents it as situated to the north-east of that chain, and within view of the Euphrates.[e]

Cilicia, or the coast of Caramania, is scarcely better known. The testimonies of Strabo and Otter prove that the most of the rivers along this coast take their rise to the north of the chain of Taurus, which they cross through narrow passes. The plateau in which these rivers have their source, between Taurus and Anti-Taurus, represents, in part, the ancient Cataonia. It is in these mountains that the wandering Caramanians, and even the inhabitants of the towns, seek for shelter from the summer heats, which prevail in great severity in the low maritime regions. These heights are crowned with cedars, while the shores of the sea are covered with entire forests of laurels and myrtles.[f] Adana, the residence of a pasha, and Sis, where the kings of the Lesser Armenia long held their court, are places of trifling importance. Tarsus, the ancient capital of Cilicia, and once the literary rival of Athens and Alexandria, is now only a town containing 30,000 inhabitants, and enjoying a pretty extensive foreign trade; but the cool waters of the Cydnus, so dangerous to Alexander, still flow through those fertile plains where Sardanapalus erected a statue of himself, with this inscription: "Enjoy the pleasures of life; all else is nothing." Cilicia, called Trachea, or the rugged, now forms the district of Itchil, subject to the Mousselim or governor of Cyprus. The pasha of Kutaïeh reigns over Tekieh, or the coasts of the ancient Pamphylia and Lycia. Satalia, situated upon a dangerous gulf, below a forest of lemon and orange trees, has a flourishing trade, and reckons more than 30,000 inhabitants.[g] Upon the picturesque shores of Lycia, the magnificent ruins of Myra, now Cacamo, attest the opulence of the age of Adrian and of Trajan; the Necropolis, or place of interment, has of itself the appearance of a city.[h] In the interior, which answers to ancient Pisidia, accident has preserved to a town inhabited by Turks, the name of Sparta or Isparté; it is the remains of the ancient Sagalessus, which boasted of a Lacedemonian origin, and the imposing ruins of which are found in the neighbourhood.[i] This country, which is seldom visited, is an upland plain, with one or more lakes, the waters of which are carried off by the river Duden, which often disappears in subterranean caverns.[k]

The western coasts of Asia, which are more frequently visited, would of themselves furnish matter for an interesting volume. It was here that arts and letters embellished the cities of Doris, of Ionia, and Eolis; it is here that the melancholy ruins of Halicarnassus, Miletus, and Ephesus, arrest the footsteps of the classic traveller. But if it be true that the ruins of Ephesus are found to the south-west of Ayasaluk,[l] the site of the celebrated temple of Diana is not yet determined. Neither the learning of Chandler, nor the ingenuity of Choiseul, has been able to decide this question. It is probable that they should have sought for the remains to the north of Ayasaluk, (which stands on the first site of Ephesus, before the buildings of Lysimachus,) in the marshy plains watered by the Caÿster.[m] Doubts also are entertained as to the situation of ancient Miletus. Spon, the traveller having found at Palatsha certain inscriptions bearing the name of the Milesians, imagined that he had discovered the ruins of the ancient city.[n] Chandler, setting out from such data, sought in vain for the Latmian Gulf, with the cities of Myus, Heraclea, and others situated upon its shores. He supposed that this gulf was represented by the lake Ufa-Bassi, and that the low grounds which separate that lake from the sea, owed their formation to the accumulated deposites of the Meander.[o] This hypothesis, which is not very intelligibly stated by its author, has found a formidable opponent in a learned German, who considers the ruins of Palatsha as those of Myus, a small town incorporated with Miletus, the inhabitants of which, on that account, were called Milesians. He thinks that Ufa-Bassi is the lake which, according to

[a] Paul Lucas, second voyage, c. 18.
[b] M. Trezel. Itiner. Manusc. Comp. Strabo, etc.
[c] Pegoletti.
[d] Paul Lucas, Premier Voyage au Levant, c. 24. Schellinger, Persiche und Ostindische Reise. Nuremberg, 1716. p. 68. *sqq.* (in German.)
[e] Schellinger, loc. cit.
[f] P. Belon, Observations, etc. CVII. and CIX.
[g] M. Corancez, consul general, Itineraire manuscrit.
[h] Robert Ainslie, Views in the Ottoman Empire, &c. London, 1803, plates I VIII.
[i] Paul Lucas, Second Voyage, t. I. c. 34. Troisième Voyage t. I. p. 181.
[k] Chandler's Travels in Asia Minor.
[l] Hadgi-Khalfah, Géographie Turque, p. 1835—1846.
[m] Poleni, Dissertation sur le temple de Diane, dans les Mémoires de l'Academie de Cortone. Mannert, Géog. des Grecs et des Romains, VI. p. III. p. 305—313.
[n] Spon and Wheeler, Travels, p. 358.
[o] Chandler's Travels, c. 43, etc

Pausanias, was formed by the sinking down of the soil near Myus.[a] The ruins of Miletus and the Latmian gulf should be sought for more to the south and the west. But the modifications which a skilful French geographer[b] has recently introduced into the system of Chandler, and the very accurate maps of M. de Choiseul-Gouffier, seem to establish the fact that alluvial additions have been made to the land, posterior to those mentioned by Strabo and Pausanias. The lake of Ufa-Bassi appears, from decided marks, to be the ancient Latmian Gulf; the ruins of Miletus, however, must lie farther to the west than Palatsha. This interesting question does not seem to us to have yet received an exact and perfect solution.

The modern towns of these fine regions have but little importance. Melasso contains many ruins which belong to the ancient *Mylasa*. Guzel-Hissar, the ancient *Magnesia ad Mæandrum*, has still a considerable commerce. But in ascending the picturesque valley of the Meander, the traveller discovers the ruins of the rich and magnificent city of Laodicea, now the abode of foxes. Tireh possesses valuable manufactories. The confined port of Scala Nuova is much frequented, and this town which, in some measure, supplies the place of the city of Ephesus, displays, in a kind of amphitheatre, its mosques intermingled with beautiful cypresses.

Smyrna, the queen of the cities of Anatolia, and extolled by the ancients under the title of "the lovely, the crown of Ionia, the ornament of Asia," braves the reiterated efforts of conflagrations and earthquakes. Ten times destroyed, she has ten times risen from her ruins with new splendour. According to a very common Grecian system, the principal buildings were erected on the face of a hill fronting the sea. The hill supplied marble, while its slope afforded a place for the seats rising gradually above each other in the stadium, or great theatre for the exhibition of games. Almost every trace of the ancient city, however, has been obliterated during the contests between the Greek empire and the Ottomans, and afterwards by the ravages of Timur, in 1402. The foundation of the stadium remains, but the area is sown with grain. There are only a few vestiges of the theatre; and the castle which crowns the hill is chiefly a patch work executed by John Comnenus on the ruins of the old one, the walls of which, of immense strength and thickness, may still be discovered. Smyrna, in the course of its revolutions, has slid down, as it were, from the hill to the sea. It has, under the Turks, completely regained its populousness. Its mosques and other buildings are very handsome, being built chiefly from the marble of the ancient structures. The central situation of Smyrna, and the excellence of its port, attract a concourse of merchants of all nations, by sea, and in caravans by land. The exports from this city are silks, goat and camel's hair, cottons, embroidered muslins, morocco skins, coloured camlets, wool, wax, gall-nuts, currants, amber, lapis lazuli, and a variety of drugs, as musk, galbanum, rhubarb, and various gums. We find there also a variety of carpets, besides pearls, diamonds, emeralds, rubies, and other precious stones. Smyrna, in short, is the great emporium of the Levant. This city contains 120,000 inhabitants, though frequently and severely visited by the plague.

From the Meander to the Propontis, order, tranquillity, and increasing opulence bear witness to the excellent administration of the family of Kara-Osman, who, for sixty years, have reigned with almost absolute authority. The husbandmen sow their seed, and gather in their harvests in peace. The Greeks have, in the ancient Eolis, schools where Homer and Thucydides are read.[c] The Turcomans, whose abodes are near the sources of the Hermus, now called the Sarabat, are employed in agriculture. If the residence of Crœsus can no longer be recognised in the village of Sart, other places preserve some vestiges of their ancient grandeur. Magnisa and Philadelphia, called by the Turks Alla-Shehr, are flourishing in consequence of their extensive commerce. Immense crops of the finest cotton of Asia enrich Akhissar, the ancient Thyatira, and Kirk-Agatch, a newly-built town. Bergamo, the ancient Pergamus, presents to our view magnificent ruins. Phokia, or Phocéa still possesses its excellent harbour.—The little peninsula which formed the ancient kingdom of Priam has been minutely explored by various learned travellers; but they have not agreed in fixing the localities of the individual places celebrated in the immortal work of Homer. Chevalier, and others, have supposed that Troy must have occupied the site of a village called Bonarbashi, and there he thought he found the sources of the Scamander. Dr. Clarke found in that place not two fountains merely, one hot and one cold, as had been said, but numerous fountains all warm, raising the thermometer to 62° of Fahrenheit. They do not form the source of the Scamander, which lies forty miles in the interior. Dr. Clarke found, on entering the plain of Troy, first the Mender, which its name and every other circumstance clearly fixed as the Scamander. He found also the Thymbrius, under the modern appellation of Thymbroek, though other inquirers conceive it to be the Simois. This last he thought he recognised in the Calliphat Osmak, which runs into the Scamander by a sluggish stream across an extensive plain, and the plain thus becomes that of Simois, on which were fought the great battles recorded in the Iliad. The Ilium of the age of Strabo, we know, was situated near the sea, and he says that it was four miles in a certain direction from the original city. In this distance and direction, Dr. Clarke discovered two spots marked by ruins, which, from different circumstances, seem very likely to have been old and new Troy.[d] The grandeur of the scenery, viewed from this plain, is almost indescribable; Samothrace, on one side, rearing behind Imbrus its snow-clad summit, shining bright, and generally on a cloudless sky; while, on the other side, Gargarus, the highest of the chain of Ida, rises to an equal elevation. These scenes are well fitted to impart the most feeling interest to the descriptions of Homer, when read or remembered on the spot.

[a] Mannert, Géographie des Grecs et des Romains, VI. p. III. p. 252-266.

[b] Barbié du Bocage, Recherches sur les atterrissemens du Méandre, dans le Mag. Encycl. de M. Millin, vol. IV. p. 74, and his notes upon Chandler.

[c] Choiseul-Gouffier, Voyage Pittoresque de la Grece, vol. II.

[d] Clarke's Travels.

Whatever difficulty may exist as to the minutiæ, all the prominent features of Homer's picture are incontestibly visible; the Hellespont, the isle of Tenedos, the plain, the river, still inundating its banks, and the mountain whence it issues. A fertile plain, and a mountain abruptly rising from it, are two features which are usually combined in the sites of ancient cities. From the one, the citizens drew part of their subsistence, while the other became the citadel to which they retired on the approach of danger. The ruins of Abydos, on the shore of the Hellespont, lie farther to the north than the Castle of Asia, a fortress of small strength. Lamsaki is only a suburb of the ancient Lampsacus, the ruins of which have been lately discovered at Tchardak.[a]

Having finished the description of the peninsula of Asia Minor, we come to explore that chain of islands which forms a border to it upon the west. Here every rock has its history, every island has had its renowned age, its heroes, and its men of genius.

Tenedos is still the key of the Hellespont, the Turks having given it the name of Bogtcha-Adassi. From this island, which is rich in wine, we come to Metelin, the ancient Lesbos.[b] A variety of hills, clad with vines and olive trees, rise around the numerous bays of this island. The mountains of the interior are covered with mastich and turpentine trees, pines, and cistuses. Rivulets flow under the shades of the plane tree. The wine, the figs, and the women of Lesbos, still preserve their ancient reputation. The island has about 25,000 inhabitants, 8000 of which live in the town of Castro. Passing by Cape Karabooroom, and its savage inhabitants, we come to the delightful island of Scio or Chios, which is indebted to its mastick tree for the enjoyment of a kind of liberty, in consequence of being assigned as the demesne of the sultan-mother. Industry, accordingly, the offspring of liberty, has transformed this island into a garden, although in a great measure composed of granite and calcareous rocks. M. Olivier computed the population to be about 110,000, almost all Greeks, of whom 30,000 reside in the capital, which bears the same name as the island. Lemons, oranges, and citrons, together with an intermixture of fig-trees and pomegranates, perfume the air; while roses grow in as great numbers as thistles in other regions. Crops of barley are raised, and oil and muscat wine are made. Neither the cotton nor the silk which grows in the island is sufficient to employ the industry of the inhabitants, who can imitate all the stuffs of Lyons and India. The women of Scio, handsome as the Grecian statues, disfigure their persons by their whimsical dress.[c d]

After having traversed the gulf of Scala Nuova, we reach the large port of Vathi in Samos, an island of about half the extent of Scio, and inhabited it is said by not more than 12,000 souls. The soil however is very fertile, and produces muscat wine, oranges, oil, and silk; fine marble is also found in the island. Samos presents to antiquarians the superb remains of a temple of Juno. It is the only island of the Archipelago where the women have the reputation of ugliness. Megalo-Chori is the chief place in modern times. Mount Kertis retains snow on its summit during the greater part of the summer.[e]

We pass in front of Nicaria, rich in building timber, but in other respects barren; it is inhabited by a few Greeks, very poor, and very proud, who pretend they are sprung from the imperial blood of the Constantines, and who never sleep in a bed even when they can get one. Neither shall we stop at Patmos, which one of its inhabitants described about 130 years ago as abounding in wines, corn, and figs, adorned with myrtles and arbuti, and containing about sixteen or seventeen villages;[f] but since that time it has greatly degenerated. Lero, with a large port, Calimno, which produces excellent honey, and other small islands, lie to the south of Samos. We now come to the birth place of Hippocrates, Cos, a name now disfigured into Stanco. This island presents to the view fine plantations of lemon trees, intermixed with stately maples; it has given its name in Latin to a kind of stone which is much used for sharpening tools,[g] and is commonly called Turkey stone.

Opposite to the extremities of Asia, to the south-west, is the island of Rhodes, celebrated in antiquity for its equitable code of laws, and in the fourteenth and fifteenth centuries as the residence of the knights of the order of Saint John of Jerusalem. This island, which produces but little grain, still boasts of its fruits, its wines, its wax and honey. It exports soap, fine carpets, and camlets. Rhodes, the capital, is situated on the declivity of a hill facing the sea. It exhibits for a league round, an agreeable mixture of gardens, minarets, towers, and churches. It is one of the best fortresses which the Turks possess. It has a very good port, the entrance of which is confined by two rocks, upon which are erected two towers that command the passage. The famous colossus of bronze, which was 130 feet high, appears not to have been placed across the entrance of the great port, but rather upon the mole or pier which divided it from the interior port, where the knights kept their galleys.[h]

The southern coasts of Asia Minor are almost destitute of islands. The steep declivities of Mount Taurus run close along the shore. Some small rocky islands, such as Castelrosso, are barely detached from the continental precipice by narrow channels. Leaving Cape Chelidoni behind, we now direct our course to the port of Paphos in the island of Cyprus. The moderns have changed the name of that city into Baffa, and that of Amathus into Limasol. An earthquake has destroyed Salamis, and the ruins which bear its name, being nearer the river Pediæus, belong rather to the new city of Constantia, built by the Emperor Constantius.[i] Other cities have acquired the pre-eminence; Nicosia, in the

[a] Castellan, Lettres sur la Grece, etc. I.
[b] Olivier, Voyage dans l'Empire Ottoman, II. 84—102.
[c] Tournefort, I. Lettre 9. Olivier, II. 103, *sqq.*
[d] In April, 1822, the Turks took possession of Scio, which had just revolted, destroyed the city, and massacred and enslaved the inhabitants.
[e] Joseph Géorgirènes, Archbishop of Samos, Description of Samos, Nicaria, Patmos, &c. London, 1809. (Paulus, Magasin des Voyages au Levant, V. 273.)
[f] Id. ibid. p. 269.
[g] Thompson's Travels, &c. III. 103.
[h] Diod. Sicil. XX. 85. Olivier, III. 347.
[i] Pococke, II. 313, (in German.)

centre, is become the capital. The commerce of Famagusta, together with that of Larnica and Salines,[a] is not in a flourishing condition. The ancients extol the fertility of this island; the moderns entertain nearly the same opinion of it. The snow, which remains for a long time upon Mount Olympus, (now called the mountain of Santa-Croce,)[b] produces a sharp cold in winter, which renders the transition to the heat of summer more insupportable. The most valuable production at present is cotton; we also send thither for turpentine, building timber, oranges, and, most of all, Cyprus wine. Hyacinths, anemonies, ranunculuses, and the single and double narcissus, grow here without cultivation. They deck the mountains, and give the country the appearance of an immense flower garden. But agriculture is neglected; and an unwholesome atmosphere infects some districts, where the draining of the stagnant water is unknown. It is supposed that the name of Cyprus, or Kyprus, was given to the island from its abounding in copper; or *vice versa*, the metal derived its name from that of the island, copper being called *æs Cyprium*. Besides this metal, it once produced gold, silver, and emeralds. What is called the diamond of Paphos, is a rock crystal which is found near that town. Amianthus, red jasper, and umber, are also exported from this island.

The inhabitants of Cyprus are a fine race of men; the women, by the vivacity of their large eyes, seem to declare how faithful they still are to the worship of Venus. This island, anciently divided into nine kingdoms, each of which contained several flourishing cities, had perhaps a million of inhabitants; it has now only 83,000. The grand viziers possess it as an appendage to their place; and, to make it as profitable as possible, they let the office of superintendent or mousselim to the highest bidder.[c] During the decline of the eastern empire, Cyprus was conquered by Richard the First, king of England, and given to the house of Lusignan, as an English fief, by way of indemnity for the loss of the throne of Jerusalem.[d] In the fifteenth century the heiress of that house resigned the sovereignty of it in favour of the Venetians, who in 1570 were expelled from it by the Turks; but, a princess of the house of Lusignan having married a Duke of Savoy, the kings of Sardinia still make pretensions to the crowns of Cyprus and Jerusalem.

Here we conclude our topographical sketch of Asia Minor and the neighbouring islands. It has necessarily been rapid, because vast tracts, either quite unknown, or known only from the vague relations of the orientals, are interposed between the routes of European travellers, routes which are neither sufficiently numerous, nor sufficiently diversified to furnish us with a modern topography equal to that which may be extracted from the Greek and Roman writers.—It would be very easy for us to protract this description by repeating the observations so often made upon the manners of the different nations which inhabit this fine country; but the few details of this kind in which we shall allow ourselves to indulge will be found in a more appropriate place. The Greeks and Armenians who inhabit the commercial towns will occupy our attention when we describe the countries whence they derive their name. The Koords and the Turcomans, whose tribes, sometimes pastoral and sometimes agricultural, are scattered over the interior, will also form the subject of a separate article. Lastly, the Turks, their power and civil policy, come most properly to be noticed after the description of the whole of Turkey in Asia. Here then it only remains for us to compare the ancient and modern divisions, a laborious undertaking, the results of which our readers will find in the subjoined tables.

[a] Salines is the port of Larnica, which stands at some distance from the sea. It is so called from a cluster of salt lakes in its vicinity.—P.

[b] The mountain of the Holy Cross.—P.

[c] Mariti, Travels.

[d] Æneas Silvius, Cosmograph. c. 97.

TABLE

OF

THE DIFFERENT APPLICATIONS OF THE NAMES OF

ASIA, ASIA PROPER, AND ASIA MINOR.

Asia, or Asis, a province of Lydia.		A canton comprised between Mount Tmolus, Mount Messogis, and the Caÿster.[a]
Asia, a part of the world.	Lower Asia. (ἡ κατω Ασια.)	Pontus, Paphlagonia, Bithinia, Lydia, &c.; Phrygia, Cappadocia, Cilicia, Syria, (Arabia?)
	Upper Asia. (ἡ ἀνω Ασια.)	Caucasus, Armenia, Mesopotamia, Media, Persia, &c. &c. Sythia, India.[b]
Asia, kingdom, (called also the kingdom of Pergamus.)		Mysia, Phrygia, Lycaonia, Lydia.[c]
Asia, a prætorian province, and afterwards a consular one.		Mysia, Lydia, Ionia, Caria, Phrygia.[d]
Asia Proper. (ἡ ἰδιως καλουμενη Ασια.)		Sometimes synonymous with Prætorian Asia, but commonly taken as comprehending the peninsula as far east as the Halys, and the gulf of Tarsus.[e]
Asia, a diocese under Constantine.		Prætorian Asia, together with Lycia and Pamphylia, but excluding the western coasts.[f]
Proconsular Asia, same epoch.		The western coasts from Cape Lectum[g] to the environs of Miletus.[h]
Asia Minor, in the fourth century.		All the peninsula which we call Asia Minor.[i]

DIVISIONS OF ASIA MINOR.

I.—*Asia Minor, according to the most usual divisions among the ancient Greeks.*

Grand Divisions.	Sub-divisions.	Principal Towns.
Mysia.	Great Mysia.	Pergamus.
	*Theutrania.	
	Æolis.	Cyme.
	Coast of the Pelasgi, Leleges, &c.	Adramyttium.
	Island of Lesbos.	Mytilene.
	Troas.	Troy.
	*Dardania.	
	Little Mysia.	Cyzicus. Lampsacus.
	N. B. Troas and Little Mysia formed Little Phrygia.	
Lydia.	Interior Lydia.	Sardes, Philadelphia.
	1. Lydia.	Thyatira.
	2. Mœonia.	
	3. Asis or Asia.	
	Maritime Lydia or Ionia.	Phocœa, Smyrna, Erythræ, Clazomene, Teos, Lebedus, Colophon, Ephesus, Priene, Myus, Miletus, (these three are in Caria,) Island of Samos, Island of Chios.
Caria.	Interior Caria.	Alabanda, Stratonicea, Mylasa.
	Maritime Caria, or Doris.	Halicarnassus, Cos, Cnidus, Rhodes.
Lycia.	Lycia Proper.	Patăra, Myra.
	Milyas (Solimi.)	

a Homer, Iliad, II. v. 462. Dionys. Perieg. V. 836. Herodotus, IV. 45, &c.
b Xenophon and Strabo, passim.
c Strabo, XII. 845. (Edi. Almel.) Tit. Liv.
d Cic. Orat. pro Flacco, cap. 27. Strabo, XIII. 626.
e Notit. Imperii. I.

I.—*Continued.*

Grand Divisions.	Sub-divisions.	Principal Towns.
Pamphylia.		Attalia.
Pisidia.	Pisidia Proper.	Salagassus,[k] Selga.
	Canton of the Etenenses.	
	— of the Homonadenses.	
	— of the Oroandici.	
	Isauria.	Isauria, Lake Coralis.
Phrygia.	Phrygia Proper.	Synnada, Apamēa, Cotyæum, Cibyra.
	*Phrygia Epictetos.	
	Lycaonia.	Iconium, Laodicea combusta, Amorium.
	Galatia (Gallo-Græcia.)	Ancyra, Gordium, Tavium, Pessinus.
	1. Trocmi (Tavium.)	
	2. Tectosages (Ancyra.)	
	3. Tolistobogi (Pessinus.)	
Bithynia.	Bithynĭa.	Prusa, Nicæa.
	Thynia.	Nicomedia, Chalcedon.
	Mariandyni.	Heraclea, Bithynium.
Paphlagonia.		Gangra, Pompeĭopolis, Sinope, Amastris.
Pontus.	Country of the Leuco-Syri.	Amisus.
	*Gadilonitis.	
	*Saramene.	
	*Phazemonitis.	
	Galatian Pontus.	Amasia, Comana Pontica.
	*Themiscyra.	
	*Phanaræa.	
	*Daximonitis.	
	Polemoniac Pontus.	Sebaste, Neo-Cæsarea, Œnoe, Polemonium.
	*Sidene.	
	*Calaupene.	
	*Chalybes (western.)	
	Cappadocian Pontus.	Pharnacia, Cerasus, Trapezus, Rhizæum, Apsarus.
	*Tibareni.	
	*Mosynæci.	
	*Colchi (western.)	
	*Heptacometæ (seven cantons.)	
	*Macrones or Tzani.	
Cappadocia.	Cappadocia Proper.	Mazaca or Cæsarea, Archelaïs Nazianzus, Tyana.
	1. Moramene.	
	2. Garsauritis.	
	3. Kammamene.	
	4. Tyanitis.	
	5. Cilicia.	
	6. Sargarausene.	
	Cataonia.	Cybistra, Comana.
	Melitene.	Melitene.
	Armenia Minor.	Zimara.
Cilicia.	Cilicia Proper.	Tarsus, Mopsuestia.
	Cilicia Trachea (Aspera.)	Seleucia, Selinus.
Cyprus.	Kingdom of Salamis. — Chitrus.	Salaminia. Salamis.
	— Citium. — Curium.	Amathusia. Amăthus.
	— Paphos. — Arsinoe. — Soloe.	Paphia. Paphos.
	— Lapethus. — Ceronia.	Lapethia. Lapethus.

f Strabo, II. 188.
g Cape Baba.—P.
h Eunapius in Maximo, p. 101. edit. Plaut. Cod. Theodos. V. tit. 2.
i Oros. Histor. I. c. 2. Constantin. Porphyrog. de Themat. I. 8. 19.
k *Sagalessus*, p. 240; *Sagalassus*, D'Anville.—P.

II. *Asia Minor, according to the Divisions of Constantine.*

Dioceses.	Provinces.	Towns.
Diocese of Asia. Ephesus, the Capital.	Pamphylia.	Attalia.
	Pisidia.	Sagalassus-Lacedæmon.
	Lycaonia.[a]	Iconium.
	Phrygia pacatiana.	Laodicea.
	Phrygia salutaris.	Synnada. Cotyæum.
	Hellespont.[b]	Pergamus.
	Lydia.	Philadelphia.
	Caria.	Stratonicea.
	Lycia.	Myra.
	The Islands.	Rhodes.
	Province of Proconsular Asia, independent of the diocese of Asia.[c]	Adramyttium. Phocæa. Smyrna. Miletus.
Diocese of Pontus. Cæsarea, the Capital.	Bithynia.	Chalcedon.
	Honorias.[d]	Claudiopolis.
	Paphlagonia.	Pompeiopolis.
	Galatia under Theodosius. Galatia 1-a. / Galatia 2d-a. v. salutaris.	Ancyra. Pessinus.
	Helenopontus.[e]	Sinope, Amisus, Neo-Cæsarea.
	Pontus Polemoniacus.	Cerasus, Trapezus.
	Cappadocia under Valens. Cappadocia 1-a.[f] / Cappadocia 2da.[g]	Cæsarea. Tyana.
	Armenia prima.	Sabus.
	Armenia secunda.	Melitene.
Under the Diocese of the East.	Cilicia prima.	Anazarbus.
	Cilicia secunda.	Tarsus.
	Isauria.[h]	Selinus, Seleucia, Laranda.
	Cyprus.	Constantia (Salamis.)

N. B. The division of the empire of the East by Themata, having had but little duration, and no influence upon the modern divisions, we shall not give it. It may be seen in Banduri's Eastern Empire. We shall only observe that the Thema Anatolicon of the Byzantines nearly included Prætorian Asia. This is the first time that Anatolia makes a figure in geography; but the use of the term Ανατολικη, (supple χωρη,) that is, the country of the Levant, was, without doubt, anterior to the division by Themata.

III. *Asia Minor, according to the Turkish Divisions, in the Djehan-numa.*[i]

Turkish Divisions.	Chief Towns.[k]	Ancient Divisions corresponding.
I. *Pashâlic of Anadholy.*		
1. Liwah, or Sandgiacat of Kutaieh .	*Kutaieh (Cotyæum.)	Western and Central parts of Phrygia properly so called.
	Degnizlu or Lazakiéh. (not far from Laodicea upon the Lycus.)	
2.—Sarou-Khan . .	*Magnisa (Magnesia ad Sipylum.) . . .	Northern Lydia. N. B. Sarou-Khan is the name of a prince who reigned over this country.
	Akhissar (Thyatira.)	
	Fotchia (Phocæa.)	
3. — Aidin . .	*Tireh	Central and Southern Lydia. Parts of Ionia.
	Guzelhissar (Magnesia ad Mæandrum.)	
	Allashehr (Philadelphia.)	
	Ayasaluk, Sart, &c.	
4. — Mentesh . .	*Mullah.	Caria; perhaps a part of Lycia.
	Mentesh (Myndus.)	
	Melasso (Mylasa.)	
5. — Tekieh . .	*Antaliah (Attalia.) .	Lycia and Pamphylia.
	Kupribazar (Perga?)	
	Iighder (Olympus?)	
6. — Hamid . .	*Isparteh (Sagalassus-Lacedæmon.)	Milyas and the interior of Pisidia.
	Bardah.	
	Akshar.	
7. — Karahissar-Sahib . . .	*Karahissar (Celænæ?)	South East parts of Phrygia.
	Boulwadin (Philomelium.)	
	Sandhoukhi.	
8. — Sultan Eugny	*Eskishehr (Dorylæum.)	Phrygia Epictetos. Parts of Galatia.
	Kodgeashehr (Nacolia.)	
	Iin-Eugny.	
9. — Angouri . .	*Angouri (Ancyra.)	Central Galatia. (Tectosages.)
	Canton of Haimaneh.	
10. — Kiangari . .	*Kiangari (Gangra.)	The interior of Paphlagonia, (supposing, as we do, that Changreh and Kiangari are the same place.)
	Toussieh (Tocia.)	
	Tcherkis.	
	Tokhat.	
11. — Kastamooni .	*Kastamooni. . . .	Maritime Paphlagonia with Mount Olgassys.
	Sinoub (Sinope.)	
	Tasch-Kouprou (Pompeiopolis.)	
	Inehboli (Ionopolis.)	
12. — Boli . . .	*Boli (Claudiopolis.)	Honorias, or Eastern Bithynia, with a part of Paphlagonia.
	Amasserah (Amastris.)	
	Bend-Erekli (Heraclea.)	
	Viransheher.	
13. — Khudavendkiar	*Broossah (Prusa ad Olympum.)	Southern Bithynia, with the interior of great Mysia.
	Jegnishehr.	
	Pergamah (Pergamus.)	
	Bazarkeui.	
14. — Karassi . .	*Balikesri (Miletopolis.)	Coasts of Mysia, and Eolis, opposite Lesbos, and a part of the interior.
	Edremid (Adramyttium.)	
	Sandarghui.	
	Ayazmend (Elæa.)	
15. — Kodja-Ili . .	*Isnikmid (Nicomedia.)	Bithynia to the west of Sangarius.
	Isnik (Nicæa.)	
	Kadikeui (Chalcedon.)	
	Iskudar (Chrysopolis.)	
	Imperial Domain.	
16. — Bigah . . .	*Bigah (Zelia?) . .	Troas and Little Mysia.
	Sultanich.	
	Kapoudagui.	
	Bonarbashi.	
17. — Sogla . . .	*Ismir (Smyrna.) .	Part of Ionia.
	Ourlah.	
	Menimen (Temnos.)	
II. *Pashâlic of Siwas.*		
1. Liwah of Siwas .	*Siwas (Sebastia.) .	Calupene in Polemoniac Pontus.
	Tocat (Comana Pontica) Waywodat. .	Daximonitis in Galatian Pontus.
2. — Djanick . .	*Samsoun (Amisus.)	Coasts of Helenopontus beyond the Halys and of Galatian and Polemoniac Pontus.
	Unieh (Œnoé.)	
3. — Arebkir . .	*Arebkir (Arauraci?)	Confines of Armenia Minor, and Pontus.
4. — Diwriki . .	*Diwriki.	Idem.
5. — Tchouroum .	*Tchouroum (Tavium.)	Eastern Galatia.
	Osmandjik.	
6. — Amassiah . .	*Amassiah (Amasea.)	Chiliocome and Phanarœa in Galatian Pontus.
	Marzivan (Phazemon?)	

a The ancient province re-established only comprised the country in the neighbourhood of Iconium. It appears to answer to the sandgiacat of Konieh. Pisidia, aggrandized by a part of the ancient Lycaonia, appears to be represented by the sandgiacat of Isbarteh or Sparta, the town of this name having succeeded to Lacedæmon-Sagalassus.

b Comprising all ancient Mysia.

c The proconsul, independent of the vicar of the diocese of Asia, and of the prefect of the East, inspected the provinces of the Hellespont and the islands; thus, his prefecture represented in some respects the pachalick of the Capudan-pacha, or great admiral.

d Theodosius the II. named it thus in honour of his uncle Honorius. It appears to be represented by the sandgiacat of Boli.

e Named in honour of the mother of Constantine.

f Comprising the ancient strategiæ of Cilicia, Sargarausene, and Kammamené

g Comprising the strategiæ of Garsauritis and Tyanitis.

h The Isaurians, almost always in rebellion, took possession of Cilicia Trachea.

i *i. e.* The Mirror of the World, a geographical work, composed by Hadgi-Khalfah, the manuscript translation of which is preserved in the royal library at Paris.

k The towns marked with an asterisk are the chief places of the Sandgiacats.

III.—*Continued.*

Turkish Divisions.	Chief Towns.	Ancient Divisions corresponding.
7. — Bouzok . .	*Jeuzgatt[a] (Mithridatium?)	Confines of Pontus, of Cappadocia, and Galatia.
III. *Pashâlic of Tarabozan.*[b]		
1. Liwah of Tarabozan	Kadilik of Tarabozan (Trapezus.) . . .	Cappadocian Pontus.
	— Kiressount (Cerasus.)	
	— Irizeh (Rhizæum.)	
2. — Gounieh . .	— Gounieh (Absarus.)	Idem.
	— Athina (Athenæ.)	
	— Soumlah.	
	— Vikah.	
3. — Batoomi . .	— Batoomi. . . .	Southern Colchis.
IV. *Pashâlic of Konieh.*		
1. Liwah of Konieh	*Konieh (Iconium.) .	Central and Southern Lycaonia.
	Ladikieh.	
	Eregli.	
2. —Nighdé . . .	*Nighdé.	Western part of Cataonia.
	Bustereh (Cibystra.)	
3. — Beysheri . .	*Beysheri. . . .	Isauria.
	Serki-Serai (Isaura.)	
4. — Akshehr . .	*Akshehr (Tyriæum.)	Western part of Lycaonia.

a Hadgi-Khalfah does not mention Jeuzgatt, but it is now the chief place of Bouzok.

b Hadgi-Khalfah considers the pashalic of Tarabozan as a dependence of Armenia.

c This country, possessed by Turcoman beys, called Doulgadir, or Zoulhadir, takes the name of Doulgadir-Ili.

III.—*Continued.*

Turkish Divisions.	Chief Towns.	Ancient Divisions corresponding.
5. — Akserai . .	*Akserai (very uncertain.)	Western and Central parts of Cappadocia.
6. — Kaisarieh . .	*Kaisarieh (Cæsarea.)	
7. — Kirshehry . .	*Kirshehry (Archelais?)	
V. *Pashâlic of Merash.*[c]		
1. Liwah of Merash	*Merash (uncertain.) .	Confines of Syria Comagene, Cataonia, and Cilicia.
	Bostan (Comana of Cataonia?)	
2. — Kars . . .	*Kars-Zoulkadry.	
3. — Aintab . . .	*Aintab (uncertain.)	
4. — Someisath . .	*Someisath (Samosata.)	
5. — Malatiiah . .	*Malatiiah (Melitene.)	Melitene.
VI. *Pashâlic of Adana.*[d]		
1. Liwah of Adana .	*Adana (Antiochia ad Sarum.)	Cilicia proper.
2. — Tarsous . .	*Tarsous (Tarsus.) .	Idem.
VII. *Mousselimlik of Cyprus.*		
A. Island of Cyprus.		
No Subdivisions.	Lefcosiah (Nicosia of the Europeans.)	
B Country of Iitchil.[e]		
1. Liwah of Iitchil .	Selefkeh (Seleucia.) .	Cilicia Trachea.
	Selinti (Selinus.) . .	
2. — Alanieh . .	Alanieh (Side?) . .	Pamphylia.

d This little country was a principality of the Turcoman beys, called Ramadan-Oglou, or Sons of Ramadan.

e When the Osmanlis made the conquest of the State of Karaman, they divided it into two parts, viz. 1st, Kharidg, or exterior country to the north of Taurus. 2d, Iitchil, or interior country to the south of that chain. Djehan Numa, p. 1750 of the manuscript translation.

BOOK XXVII.

TURKEY IN ASIA.

PART II.

Including Armenia, Mesopotamia, and Irac-Arabi.

The eastern provinces of the Turkish empire in Asia form three natural divisions: the region of Orontes and Libanus, or Syria and Palestine; that of the sources of the Euphrates and of the Tigris, or Armenia with Koordistan; finally, the region of Lower Euphrates, or Al-Djesira with Irac-Arabi, otherwise Mesopotamia, and Babylonia. We shall here connect the two divisions on the Euphrates, without confounding them. Syria will be described in a separate book.

Armenia, Mesopotamia, and Babylonia, though greatly neglected by modern geographers, have a good claim to our careful attention. It was in this country that the first cities known in history were built, and the first kingdoms formed. It was here that Alexander gave the mortal blow to the colossal monarchy of Persia. At a later period, the banks of the Tigris and Euphrates became the bloody theatre where Trajan, Julian, and Heraclius conducted the Roman legions against the squadrons of invincible Parthia. In modern times, the Osmanlis and the Sophis, the sect of Omar and that of Ali, are the two great powers who dispute the mastery of these countries. Nature has here presented us with a sufficient number of objects both of interest and study, independently of the transactions of men, and their transient power. There are few countries of the globe where, in so small a space, so many striking contrasts are found united. Within an extent of ten degrees of latitude, we have at Bagdad a heat equal to that of Senegambia, and on the summit of Ararat eternal snows. The forests of firs and oaks in Mesopotamia join those of palms and orange trees. The roaring of the lions of Arabia echoes to the howling of the bears of Mount Taurus. We might indeed say that Africa and Siberia have here given each other a meeting.

This near approach of climates so opposite, principally arises from the great differences which are found in elevation. Armenia, which is a very elevated plain, is encompassed on all sides by lofty mountains. Ararat, always whitened with snow, rises in the centre of this country.[a] To the north, the mountains of Tcheldir, and Djanik, separate Armenia from the Euxine Sea. This chain, although in part covered with fine forests, does not appear to yield in height to Caucasus; for in the month of June snow sometimes falls near Erzroom upon the southern declivities.[b] The chains of Taurus enter Armenia near the cataracts of the Euphrates; they rise considerably in advancing to the east: the *Niphates* of the ancients, to the south-east of the lake Van, derives its name from the snows which cover its summits all the year.[c] The Gordiæan mountains of Xenophon, called Corduene in the map of d'Anville, fill the whole of Koordistan; one branch prolonged to the south is the *Zagrus* of the ancients, which separates the Ottoman empire from Persia. Its lower branches terminate at some leagues from the eastern banks of the Tigris. A detached branch of Taurus, the *Mons Masius* of the ancients, passes between the Tigris and the Euphrates, and forms the declivity upon which the town of Merdin is situated, and then terminates in the hills of Sinjar, to the west of Mosul. From these two points an immense plain extends to the coasts of the Persian Gulf, where the wearied eye scarcely perceives the slight undulations of the ground: a great part of these plains, below the point where the two rivers unite, was formerly covered with a number of lakes now dried up,[d] and even now there are a great many tracts which are inundated by the slightest increase of the rivers.

To this general description of the country, we shall now add that of the two great rivers which water it.

The Euphrates takes its rise from several sources; two branches, in particular, dispute the honour of being the principal; one rises not far distant from the town of Bayazid, in the mountains named Ala-Dag, anciently mount *Abus*, and of which Ararat makes a part. This river, which bears the name of Murad, disappears under ground at the distance of four hours' travelling from Bayazid.[e] It re-appears, and receives, near Melaskerd, another river of the same name, and traverses all the district of Turuberan, the southern part of Armenia Proper. The other branch of the Euphrates, which the Orientals call Frat, is formed under the walls of Erzroom, by the junction of two small rivers, one of which probably represents the Lycus of Pliny; these two rivers united do not equal the Murad, which Xenophon considered the real Euphrates. The Frat and the Murad unite their waters a little below the town of

[a] Tournefort, etc.

[b] Djehan Numa, p. 1136. French manu cript translation in the Imperial library. Travels of a missionary, p. 94. Paris, 1730.

[c] Manuscript account of M. Fabvier.

[d] Pliny vi. c. 27. Strabo xv. p. 1060, (Amelov.) Albulfeda, Busching, p. 256.

[e] Hadgi-Khalfah, p. 1131, *sqq.* D'Anville, Euphrates and

Arabkir, the river, now very considerable, descends rapidly towards the defile called the Pass of Nushar; having passed this, it winds along an elevated plain, but soon meeting with a fresh inequality of ground, it forms a double cataract twenty-two miles[a] above Semisat, or Samosata. Disengaged from all the obstacles which restrained its force, it now rolls majestically along through a wide and verdant valley. To the south of Kerkisiéh it enters the immense plains of Sennar; but being repelled on the Arabian side by some sandy and calcareous heights, it is forced to approach the Tigris in its course.

This other river, the rival and companion of the Euphrates, has its most considerable source in the mountains of the country of Zoph, the ancient Sophené, a part of Armenia. The Euphrates, already of great size, receives all the streams of that country; but, by a singular exception, this, the smallest among them, escapes the destination of its neighbours. A rising ground prevents it from proceeding to the Euphrates. A deep ravine in the mountains above Diarbekir opens a passage for it, and it takes its speedy course across a territory which is very unequal, and has a powerful declivity. Its extreme rapidity, the natural effect of local circumstances, has procured for it the name of *Tigr* in the Median language, *Diglito*, or *Didjileh* in Arabic, and *Hiddekel* in Hebrew; all of which terms denote the flight of an arrow.[b] Besides this branch, which is best known to the moderns, Pliny has described to us in detail another, which issues from the mountains of Koordistan to the west of the lake Van. It passes through the lake Arethusa. Its course being checked by a branch of Mount Taurus, it falls into the subterranean cavern called Zoroanda, and appears again at the bottom of the mountain. The identity of its waters is shown by the re-appearance of light bodies at its issue that have been thrown into it above the place where it enters the mountain. It passes also through the lake Thospitis, near the town of Erzen, buries itself again in subterranean caverns, and re-appears at the distance of 25 miles below, near Nymphæum. This branch joins the western Tigris below the city of Diarbekir.[c]

In proportion as the Tigris and the Euphrates approach one another, the intermediate land loses its elevation, and is occupied by meadows and morasses. Several artificial communications, perhaps two or three which are natural, form a prelude to the approaching junction of the rivers, which finally takes place near Korna. The river formed by their junction is called Shat-al-Arab, or the river of Arabia. It has three principal mouths, besides a small outlet; these occupy a space of thirty-six miles.[d] The southernmost is the deepest and freest in its current. Bars of sand formed by the river, and which change in their form and situation, render the approach dangerous to the mariner. The tide, which rises above Bassora, and even beyond Korna, meeting with violence the downward course of the stream, raises its waters in the form of frothy billows.[e]

Such are the known facts respecting the course of these two rivers. A full discussion of the questions which have been raised on this part of geography, would require a separate treatise. Some of the ancients described the Euphrates as losing itself in the lakes and marshes to the south of Babylon;[f] others consider the river formed by the union of the two as entitled to a continuation of the name of Euphrates.[g] According to some, the Euphrates originally entered the sea as a separate river, the course of which the Arabs stopped up by a mound.[h] This last opinion has been in some measure revived by a modern traveller, who supposes that the canal of Naar-Sares, proceeding from the Euphrates on the north of Babylon, is continued without interruption to the sea.[i] The bay called Khore-abdallah would, according to this hyhothesis, represent the ancient mouth of the river; but this bay existed in its actual state, in the time of Ptolemy under the name of the *Sinus Mesanites*. With regard to the canal Naar-Sares, it appears certain that it rejoins the river near Semawé. The dry bed corresponding to the gulf of Khore-abdallah, and on which we find the remains of the old city of Bassora, terminates in the Euphrates a little to the west of Korna. The Pallacopas, or the canal of Koufa, seems to extend no farther than the lakes on the south of Babylon. The continual changes to which this flat and moveable soil is subject, the inundations of the rivers, and the works of human labour, concur to render the solution of these points impossible.

There is also some uncertainty respecting the relative size of the Tigris and the Euphrates. The last has certainly the longest course; but weakened by drains, it presents at Hilleh a width not exceeding 420 feet, while the Tigris at Bagdat is fully 600. The inhabitants of the country, in order to irrigate their lands, dam up both the one and the other with dykes, which the historians of Alexander have, in their simplicity, mistaken for military bulwarks, intended to check the progress of the Arabian pirates up the river.[k]

We must now ascend to the sources of the Euphrates, to give a description of Armenia. This country, we have already said, forms a very high plateau, crowned with mountains still higher. Ararat and Kohi-seiban show from a great distance their summits covered with perpetual snow. Several parts of Armenia have undergone changes by the operation of earthquakes. Djebel-Nimrod, *i. e.* the mountain of Nimrod, formerly emitted flames, and has still on its summit a small lake which, according to the account of a Turkish geographer, seems to be an old volcanic crater: the country seems rich in natural curiosities. The great lake of Van, sometimes called the Ardgis, is the *Arsissa palus* of Ptolemy and the Mantian lake of Strabo. Its water is very saline.[l] Two rivers near Soushesheri produce salt, the one white and the other red. The round stones found near Keify appear to be nuclei of orbicular granite. The cold, very intense in the high districts, leaves only three months for the season of vegetation, including seed time

[a] "8 Fr. leagues."
[b] Wahl, Asien, I. 711.
[c] Plin. loc. cit.
[d] "15 Fr. leagues."
[e] Philipp. à Sancta Trinitate, Itiner. p. 144.
[f] Arrian, VII. 7. Mela, III. 8. Plin. V. 26. Ptolemy, &c.
[g] Strabo, II. 132. XV. 1060.
[h] Plin. VI. 27.
[i] Niebuhr, Voyage II. 223, 253, 261.
[k] Ives' Travels, p. 51. Niebuhr, II. p. 243.
[l] Tavernier's six Journeys, l. III. cap. 3.

and harvest;[a] yet the crops of corn are abundant. Walnut and apple trees are to be found here; the latter afford, in the cold district of Akhlat, apples weighing nearly a pound.[b] As we go down the Euphrates, we see the vine and the olive flourish, although at Erzroom there are neither fruit trees nor wood for fuel.[c] The horses of Armenia are highly extolled by the ancients. Gold mines which were worked are mentioned by them.[d] At present copper and iron are exported to Mosul.[e]

Erzroom, one of the bulwarks of the Ottoman empire on the east, has walls built of clay hardened in the sun. It contains 25,000 inhabitants, of whom 8000 are Armenians. The latter are manufacturers of copper utensils, and carry on a great trade in skins and furs. Kars and Van, on the frontiers of Persia, are little known. They, as well as Erzroom, are the residences of three pashâs who govern the country. Ardgis is still mentioned as a town on the lake Van, Erzendgian on the Euphrates, and some others, among which Khanoos deserves our attention. This town is situated in the hollow of a rock, which forms a natural wall around it. In the centre of the town there rises an insulated rock.[f] This singularity leads us to recognize here the ancient Theodosiopolis,[g] which was forty-two stadia S. from the sources of the Euphrates. The towns of Baibuth and Ispir give animation to a fruitful valley, from which building timber and different kinds of conserves are exported.[h]

To the north-east of Armenia, the old pashâlic of Tcheldir, mentioned by Ricaut, and which many geographers have sought for in vain, has taken the name of Akalzike,[i] from that of a fortress situated on the Kour, and which is its capital. It is sometimes called Turkish Georgia.—South from this, and on the very frontier of the Persian province of Erivan, are the ruins of Anni, one of the ancient capitals of Armenia, on the river Harpazu, a tributary of the Araxes. These ruins present brilliant specimens of the former grandeur of the place. The whole surface is covered with hewn stones, broken capitals, columns, and shattered but highly ornamented friezes. Several elegant churches are still standing. The palace is a structure of great extent resembling a town, and superbly decorated within and without with varied and highly wrought carving on the stone, and the floors of its numerous halls are beautified with finely executed mosaic patterns. The masonry of the whole place is firm and well finished, seeming to bid defiance to the influence of time, though exhibiting the dilapidations of the ruthless hand of barbarism. Sir Robert Ker Porter, who paid it a hasty visit in 1817, says that the masterly workmanship of the capitals of pillars, the nice carvings of the intricate ornaments and arabesque friezes, surpassed any thing he had ever seen when abroad, or in the most celebrated cathedrals of England. The churches and other religious houses also abound with inscriptions; but it is completely deserted, and only the haunt of parties of desperate banditti. At a distance of five miles to the east, there is an Armenian monastery, where that hospitality is shown which, in such a country, affords a valuable solace to the pilgrim or the traveller.[k]

The Armenian nation, one of the most ancient in the world, is called in their own language *Hai-kani;* and although the accounts which the Armenian historian, Moses of Chorene, gives of a king Haik, grandson of Japhet, are involved in deep obscurity, certain it is, that the Armenian language, rude and uncouth in its pronunciation, has in its syntax more analogy with the European than with the oriental languages.[l] This nation is distinguished by an elegant form and an animated physiognomy. The constant victims of wars, waged by the great surrounding powers contending for the possession of the country, they have been forced in a great measure to leave their paternal soil. Addicted to commerce and manufactures, they have prospered in every country from Hungary to China. They find their way to places inaccessible to Europeans; they traverse the elevated plains of Tartary, and those which are watered by the Niger. With them frugality preserves the earnings of industry. In their own country, as well as abroad, they generally live in large families, under the patriarchal government of the oldest member, and in a state of happy concord.[m] But this family attachment is found but too compatible with insensibility, injustice, and perfidy, to persons of a different race. The religion of the Armenians is that of the ancient eastern church, only they deny the doctrine of the two natures in the person of Christ, or rather consider these natures as existing, but united in one;[n] they have also some peculiar notions about the Eucharist. Like the Greeks they allow the priests to marry. Their fasts and abstinences surpass in rigour and frequency those of all other Christian sects.[o] Two great patriarchs, called catholic or universal, rule the Armenian church. One, whose residence is at Etshmiazin, in the province of Erivan, or Persian Armenia, had, a century and a half ago, 150,000 families within his spiritual jurisdiction. The patriarch of Sis, in the little Armenia of antiquity, and who has formed a union with the church of Rome, reckoned only 20,000. Proceeding on this fact,[p] we may estimate the whole nation at that time at 1,700,000 individuals, and it has not probably since diminished.[q]

[a] Hadgi-Khalfah, p. 1136.
[b] "100 drachmes."
[c] Hadgi-Khalfah, p. 1117.
[d] Strabo, lib. XI. § 9. Procop. Pers. I. 15.
[e] Sprengel, Bibliothèque des Voyages, VIII. p. 2, and 93. (in German.)
[f] Hadgi-Khalfah, p. 1128.
[g] Procop. Persic. I. 17. Constant. Porphyrog. de Administ. imp. p. II. cap. 45.
[h] Hadgi-Khalfah, p. 1127.
[i] Id. p. 1069.
[k] Porter's Travels in Georgia and Persia, vol. I. p. 172.
[l] See Adelung, Mithridates, I. p. 423.
[m] Cartwright's Travels in Persia, p. II. p. 227.
[n] Nicephorus, Hist. Eccles. l. XVIII. cap. 53. Confessio Armenior. art. 26—30. Concil. Constant. 3, canon. 32, &c.
[o] Vitriacus, Hist. Orient. c 79.
[p] Leonard, Sidon. episc. ap. Thom. à Jes. l. VII. p. 1. cap. 19.
[q] Great Armenia is, at present, divided among the Russians, Persians, and Turks, chiefly the latter. It extends 300 miles, E. and W. from the Euphrates to the mouth of the Kur; and 250, N. and S. It is the native seat of the Armenian nation, and their language is here spoken pure. In other districts it is mixed. The Armenians are particularly devoted to St. Gregory, (Surp Savorich,) their patron saint. They are remarkable for their commercial spirit, which has extended them from the cities of Europe to the farthest East. Their commercial means are now very great. They are the bankers of the Turkish Government, and have the control of its pecuniary resources. They have cultivated their national literature, and have long carried on printing in their language. Their writers are numerous, particularly their historians, who form a series from quite an early period. They have also their national poets, of which the principal are Nerses, Klaietsi, and Valsram.—P.

Besides the Armenians who are engaged in trade and agriculture, and the Osmanli Turks who hold civil and military offices, Armenia maintains a Tartar nation called the Turcomans. This nation, originally inhabiting the eastern shores of the Caspian Sea, came first to establish themselves in Armenia Major, called for that reason Turcomania. But their attachment to a wandering life led several hordes of them to the interior of Asia Minor and the government of Itchil; they have adopted the Turkish language, and a rude form of Mahometanism. Ignorant, and content with a life of poverty, they support themselves on the produce of their flocks, and live generally in tents of felt.

Their women spin wool and make carpets, an article in use in that part of the world from time immemorial. The sole occupation of the men is to tend their flocks, and to smoke. Constantly on horseback, with the lance on their shoulder, a curved sabre by their side, and a pistol in their girdle, they make vigorous horsemen and hardy soldiers. They have frequent disputes with the Turks, who respect their power. About 30,000 Turcomans wander in the pashâlics of Aleppo and Damascus, the only parts of Syria which they frequent. A great part of these tribes migrate during the summer to Armenia and Caramania, where they find the pasture more abundant, and return in winter to their former quarters.

Koordistan, or the country of the Koords, extends on the south of Armenia to a length of nearly 300 miles, and less than the half in breadth.[a] The mountains known to the ancients under the names of *Gordyæi* and *Niphates*, are always partially covered with snow. No such summer heats as those which burn up the plains of Mesopotamia, extend a scorching influence to the verdant pastures where the Koord tends his flocks of goats. The cheerful vales, and the long terraces of the mountains, yield fruits and rice. The forests consist chiefly of oaks, which afford gall-nuts of the best quality of any in the east.[b] Grain, cotton, flax, and sesamum, are raised in the plains. A small tree, resembling the oak, is covered with a delicate manna, on which the ancients and moderns concur in their encomiums, without having been able to determine its nature and origin.[c] The rivers, the largest of which are the Diala and the Zaab, are rapid, and fall into the Tigris.

According to Garzoni, who passed eighteen years in Koordistan, this country consists of five principalities. That of Betlis or Bidlis comprehends the countries on the west and south-west of the lake Van, where Koordistan comes in contact with Armenia, and their limits are uncertain. The capital, which bears the same name, is situated in a charming valley covered with apple and pear trees. A little[d] to the south of that town, the road from Persia to Syria passes through a perforation in the rock.[e] The Koords of this principality are denominated Bidlisi.[f] To the south of the lake Van stands the town of Giulamerk, the capital of the principality of that name, the inhabitants of which are called Sciambo. Some call them also the Hakiary, which is perhaps the name of the reigning family.[g] The Baldinan Koords live to the west of the principality of Giulamerk, between Mosul and Bidlis. Their capital is Amadia. This district produces excellent grapes, and other fruits in abundance.[h] More to the north-west, and indeed within the pashâlic of Diarbekir, we find Djezira, the capital of a principality, the inhabitants of which are called Bottani. Here is the mountain of Djioudi, where, according to the Koords, Noah's ark rested; and that of Kiaveh, always enveloped in fogs, where wild bees hive in holes under ground, and produce remarkably fine honey, and a fragrant wax.[i] The largest principality of this country is Kara-Djiolan, with a capital town of the same name. The tribe, according to Garzoni, is called Soranes: but according to Niebuhr this is the name of the reigning family. This state, comprehending all the southern part of Koordistan, is capable of furnishing 15,000 armed men. The other four princes can only raise from 10 to 12,000 each. The two small pashâlics of Sherzour and Kerkouk, governed by mousselims or intendants, appear to be formed by forcible encroachments on the principality of Kara-Djiolan. There is a town called Sha-meran on the Diala, which occupies so steep a position, that its only entrance is by ladders formed of vine branches.[k] Another town, Erbil, represents the ancient Arbela, immortalised by the defeat of Darius and the fall of the Persian monarchy.

Some other independent cantons are mentioned by authors. The Urghiany on the Persian frontier are quite different from the other Koords. Perhaps they are the descendants of the Hyrcanians, of whom colonies were established by the Persians in other parts of their empire. The Sekmans are shepherds and robbers, who make predatory incursions into Armenia. The Turkish geographers mention several Koordish tribes dependent on the pashâlic of Diarbekir, but these wandering hordes form no part of the population of Koordistan.

The Koords, the descendants of the ancient *Karduchi Gordyæi*, or *Kyrti*, speak the Persian language, mixed with several Arabic and Chaldean terms. They make use of the Persian character; and a *mollah* or doctor is kept in each village who understands the Persian language.[l] The Mahometan religion is here conjoined with various superstitions, seeming remnants of the system of the ancient magi. According to the Turks, they offer worship to the devil, that is, the evil principle, the Ahriman of the ancient Persians.[m] About 100,000 Koords are Nestorian Christians, and acknowledge the authority of two hereditary patriarchs. One who always bears the name of Mar-Simon, resides at Kodgianisi near Giulamerk; he has five suffragan bishops. The other lives at Raban-Ormes; his title is Mar-Elias, and he has under him thirteen bishops. The

[a] "25 days journey by 10."
[b] Garzoni, Grammat. della lingua Kurda, Preface.—Hadgi-Khalfah, p. 1213.
[c] Strabo, II. 73. Diodor. &c. Hadgi-Khalfah, p. 1184. Olivier, IV. 274.
[d] "A farsang."
[e] Hadgi-Khalfah, p. 1092.
[f] Garzoni, l. c.
[g] Hadgi-Khalfah, p. 1106.
[h] Olivier, Voyage, IV. 275.
[i] Hadgi-Khalfah, p. 1170—1181.
[k] Idem, p. 1206.
[l] Garzoni, p. 11.
[m] Hadgi-Khalfah, p. 1211, etc.

episcopal dignity is also hereditary, descending from uncle to nephew. Their ordination often takes place at the age of twelve. The inferior clergy can scarcely read.[a b] Xenophon tells us that the Karduchi, though shut up on every side in the Persian empire, had always braved the power of the great king and the arms of his satraps. They have changed but little in modern times. Though apparently tributary to the Ottoman government, they pay but little respect to the orders of the Grand Signior and his pachâs. According to the information collected by Niebuhr, they have a sort of feudal government in their mountains. Each village has its chief, who is vassal to the prince of the tribe. Garzoni mentions that the *assiretta*, or small tribes, often revolt against their princes and dethrone them. The wars arising out of this state of anarchy have separated from the nation many families, who have betaken themselves to the wandering life of the Turcomans and Arabs. These are scattered through Diarbekir, the plains of Erzroom, Erivan, Siwah, Aleppo and Damascus. Their hordes, taken together, exceed 140,000 tents, equivalent to the same number of armed men. These Koords, like the Turcomans, are shepherds and wanderers, but differ from them in some of their customs. The Turcomans give marriage portions with their daughters; the Koords receive a price from the bridegroom. The Turcomans pay no respect to distinctions of birth; the Koords set a high value on extraction. The Turcomans are not addicted to plunder; the Koords are every where considered as robbers.[c] The Koords have a white complexion, an animated physiognomy, and an imposing aspect. They are capable of any undertaking. Mahomet himself said that they would revolutionize the world.[d]

Mesopotamia, in the most extensive acceptation, encroaches on the ancient Armenia. The pashâlic of Diarbekir comprehends the ancient Sophené; it is a country of mountains of moderate height, well watered, and intersected by agreeable valleys. The mines of Maaden furnish gold and silver, but their chief metallic production is copper. The forests, which supplied Alexander and Trajan with timber for the building of their fleets,[e] have not yet entirely disappeared from the banks of the Tigris. Those of the Euphrates are crowned with lilacs, jessamines, vines, olives, and other fruit trees. Tobacco, cotton, silk, and wool, might be added to the riches of this province, if it had a more regular government to repress the rapine of the Koords. The ancient city of Amida, now called Amid, or more commonly Diarbekir, has flourishing manufactures of morocco and silks. The houses, built of lava, amount at least to 8000, and contain upwards of 40,000 inhabitants.[f] The environs produce melons and pumpkins of a hundred pounds weight. Wheat gives a return of thirty fold. The city of Merdin consists of three thousand houses,[g] looking down from its heights of calcareous rocks on the plains of lower Mesopotamia. To Josaphat Barbaro, a Venetian traveller, Merdin appeared to have the most extraordinary possible situation. It is ascended by a stair cut in the rock more than a mile high, at the top of which is the gate; but there is no wall, the defence of the place being trusted solely to its inaccessible situation. The Turks hyperbolically say, that the inhabitants never see a bird flying over their town. It has manufactures of silk and cotton.

Descending the Tigris, we enter the pashâlic of Mosul, a small but fertile country, part of which, situated on the east of the river, belongs to ancient Assyria. It abounds in grain, cotton, figs, and pomegranates. The air, very cold in winter, is often sickly in autumn.[h] Mosul reckons from 60 to 70,000 inhabitants, of whom 15,000 are Turks, an equal number Koords, 25,000 Arabs, and 8000 Christians. Governed by a pashâ who is almost hereditary, this city enjoys a tolerable share of liberty; it is a place much frequented by merchants. It has its manufactures of morocco and of cotton. The name of Mosul affords the etymology of the term *muslin*, in French *mousseline*.[i]—The village of Nunia on the banks of the Tigris, opposite to Mosul, is ascertained to be the site of the ancient Nineveh. Here are found a rampart and fosse, four miles in circumference; but Mr. Kinnear believes these to belong to a city founded subsequently to the time of Adrian, so that Nineveh has left no trace now in existence.

The western part of Mesopotamia, which has for its boundary the circuitous course of the Euphrates, is separated from the flat desert by the great river Khaboor, the ancient Chaboras, which, according to an oriental geographer, is formed at once by 300 salient springs.[k] Such springs create in other parts the richest verdure;[l] but in general a deficiency of water diminishes the natural fertility of this country, which cor

[a] Garzoni, p. 7. *ssq.*

[b] The following account of the Chaldæans, or Nestorian Christians on the Tigris, (Nestorian Koords,) is taken from the *Amulet*. Their number is said to be 500,000. They inhabit the country on both sides of the Tigris, in a mountainous region, extending to the W. borders of Oormia in Persia, where they have always been independent. They are said, by Fraser, to be very savage and predatory. In the 17th century, the Turks attempted to subdue them, but after losing 100,000 men, and 5 Pashas, they gave over the contest. They still always go armed, even to their worship. Their government is republican. Their Patriarch is their temporal, as well as spiritual leader. Their capital is Jolemark, (Giulamerk,) on the Zabat, a branch of the Tigris, 400 feet wide at its mouth. Its population, in winter, is about 12,000. In summer, the greater part of them retire into the mountains. The Patriarch resides at Kosharis, a smaller town, higher up on the Zabat. Amadia, in the mountains, is also one of their towns. Djessiras, (Djezira,) on an island in the Tigris, 450 miles above Bagdat by water, is now occupied by the Turks, and the residence of a Pasha. There are few Turks in their other towns, and they are not allowed the privilege of worship. If a Turk is seen in their streets, during their celebration of worship, he is put to death. They have no schools nor printing. Literary education is entirely confined to the priesthood. They read only manuscripts, of which they have a sufficient number of devotional books, particularly of the Scriptures, in their language. They were early christianized. They are not Armenians, nor do they show any regard for St. Gregory, the patron of the Armenian Church. They differ entirely from the Armenians, in doctrine, discipline, and language. They are Nestorians, or Monophysites, in doctrine. In the 17th century the Catholic Missionaries visited them, and have now many converts. They have now 3 Patriarchs; one Nestorian, at Jolemark; and 2 Catholic, not native, at Diarbekir and Mosul. All the mountaineers are Nestorians.—P.

[c] Volney, Voyage en Syrie.

[d] The famous Saladin (Salahadeen) was a Koord. The Wallee of Ardelan, the most powerful of the Koordish chiefs, is said to be his representative and lineal descendant.—P.

[e] Dio. Cass. LXXVIII. 26. LXXV. 9.

[f] M. Trezel's Journal, in MS.

[g] "4000 to 5000."

[h] Hadgi-Khalfah, p. 1134.

[i] Olivier, Voyage, IV. 265.

[k] Abulfeda, apud Busching, Magasin Géog. V. 239.

[l] Niebuhr, II. 407. Tavernier, l. II. cap. 4.

responds to the ancient *Osroëne*, and which at present forms the Mousselimat, formerly the pashâlic of Orfa. The city of this name, containing a population of 30,000 or 40,000, flourishes by its manufactures, and by the passage of the caravans of Aleppo. Some traces of volcanoes are found in its vicinity.[a] About twelve miles[b] from Djaour Kouri, to the north-east of Orfa, there is an immense number of artificial caves in regular arrangement, presenting the remains of a subterranean city.[c] Here the ancient Cyclops, Arabs, or Syrians, who inhabited these perennial dwellings, were perfectly secure from the burning summers and the chilling winters of the climate. The ruined town of Harran,[d] known in the age of Abraham, figures in Roman history under the name of Charræ. It was here that Crassus and his legions were destroyed. Two hours' walk from this city, says the Turkish geographer, are to be seen, on a place called Abraham's hill, the remains of a temple of the Sabeans or worshippers of the stars. We are informed by the ancients that there was at Charræ a temple of the god Lunus.[e]

The north-east part of the pashâlic of Orfa, or the ancient Mygdonia, presents us with luxuriant pastures and flowery hills. Hence the Greeks called it Anthemusia, from ανθος, "a flower." Here the famous fortress of Nisibis stood out so long against the arms of the Parthians. It has only left some feeble traces in the town of Nesbin, a place which is remarked for white roses.[f] Dara, another Roman fortress, has left more extensive ruins. In descending the river which runs from Nesbin to the Khabour, we come to a lake called Katonié, with an island on which a pyramid is erected.[g] On the south-east the isolated mountain of Sindjar commands an extensive view of the arid plains; its sides, watered with fresh streams, are adorned with date trees and pomegranates. But a ferocious and sanguinary race have made it the retreat of their robberies. These are the Yesidis, a Mahometan sect, who are accused of worshipping the devil, and whose character certainly corresponds to such a predilection.

The desert of Mesopotamia, in all its gloomy uniformity, now meets our view. Saline plants cover detached spots at great distances, in the burning sands or the parched selenite. Here the wormwood, like the heath in Europe, takes possession of immense spaces, to the exclusion of every other plant.[h] Flocks of fleet antelopes scour the plains where, in former times, wild asses wandered. The lion, lying in ambush in the rushes by the river side, watches the approach of these animals, and from thence, when his hunger has not found sufficient prey, he sallies in his rage, and sends his dreadful roar, like peals of thunder, echoing from desert to desert.[i] The water found here is generally bitter or brackish. It is usual to correct its taste by dissolving in it the root of liquorice, which is plenty in these parts. This desert is a continuation of the great desert of Arabia, giving a specimen of its horrors beyond the Euphrates. The air, like that of Arabia, is generally pure and dry. In the bare plains of sand it sometimes becomes burning. The miasmata arising from stagnant waters are diffused in it, and its pestilential qualities are aggravated by exhalations from sulphureous and saline lakes. It is these miasmata set in motion by some want of equilibrium in the atmosphere, that have been supposed to create that fatal wind known by the name of the samoom or samiel, which is less dreaded in the middle of Arabia than on its borders, and chiefly in Syria and Mesopotamia. When this dreadful wind arises, the sun seems covered with blood, from the dust which is raised to an immense height in the atmosphere; animals in consternation lay themselves flat on the ground to escape its torrefying force, which suffocates any living being rash enough to expose itself. A sound physical philosophy views the heat and the violent motion of the air as adequate to all its effects, which are certainly not exaggerated; but we may be permitted to reckon the poisonous impregnation attributed to it among the creations of the same propensity to the terrible, which remarks the analogy between the obscurity now imparted to the light of the sun, and the colour of blood.

This desert is skirted by some agreeable and fertile stripes. Tamarinds, wild cherries, cypresses, and weeping willows, here and there shade the banks of the Euphrates; the waters of which, raised by wheels, irrigate in various spots groves of pomegranates, lemons, and sycamores.[k] The town of Anah is one of these delicious spots. It extends on both sides of the Euphrates, and seems to belong to Arabia Deserta, of which the ordinary run of geographers make it the capital, as if a hundred wandering independent tribes required or admitted of a capital. This place seems to be at times the residence of an emir or Arabian prince, the chief of some powerful tribe. On the north of Anah, along the Euphrates, a district covered with mulberries extends as far as a place called Balis. Narrow paths lead through its thickets to hidden hovels. Here a tribe of peaceful Arabs, the Beni-Semen, raise silk-worms, and export the produce. This district, little known to European travellers, is called the country of Zombouk.[l]

The caravans which carry goods from Bagdat to Aleppo usually pass by Anah. They pay tribute to the Arabs, who reckon themselves the lords of the desert, even to the east of the Euphrates. They have to encounter the dangers of suffocating winds, swarms of locusts, and the failure of water, as soon as they depart from the line of the river. A French traveller tells us that he witnessed one of the most appalling scenes of this kind between Anah and Taibah. The locusts having devoured every thing, perished in countless heaps, poisoning with their dead bodies the ponds which usually afforded water when no springs were near.

[a] Olivier, Voyage, IV. 379.
[b] "4 hours."
[c] Hadgi-Khalfah, p. 1191, compared with Olivier.
[d] Niebuhr, II. 410. Otter, I. cap. 11.
[e] Spartian, Caracalla, cap. 7. compare with Ammian. Marcell, XXIII. 3.
[f] Hadgi-Khalfah, p. 1170.
[g] Niebuhr, II. 390.
[h] Xenophon, Cyri Exped. I. c. 5. Ammian. Marcell. XXV. c. 8.
[i] Travels and Observations of De la Boulaye-le-Gouz, p. 320, (4to edit. 1657.)
[k] Rauwolf's Travels in the East, p. 187. (in German.) Texeira, Relaciones, &c. p. 135, (Antwerp edition, 1610.) Philipp. a Sancta Trinit. &c.
[l] Hadgi-Khalfah, Turkish Geography, p. 1197.

This traveller saw a Turk running down from a hillock with despair in his looks. "I am," says he, "the most ill-fated man in the world. I have purchased, at an enormous rate, two hundred young women, the finest of Greece and Georgia. I have brought them up with great care, and now, when arrived at the age of marriage, I have come with them on my way to Bagdat, thinking to dispose of them to advantage. Alas! they are all now dying of thirst in this desert. My despair, however, is more tormenting than even theirs." The traveller, crossing the hillock, beheld a sight of horror. In the midst of a dozen eunuchs, and about a hundred camels, he saw all these girls, from twelve to fifteen years old, stretched on the ground in the agonies of a burning thirst and inevitable death. Some had already been buried; a larger number had fallen dead by the side of their keepers, who had not sufficient strength left to bury them. On every hand were heard the sobs of the dying, and the cries of those in whom enough of life still remained, begging for a drop of water. The traveller hastened to open his flask, in which a little water was left, and was now offering it to one of these poor victims. "You fool," exclaimed the Arabian conductor, "would you have us also perish for want of water?" and with his arrow laid the girl dead at his feet, laid hold of the bottle, and threatened the life of any one who should dare to touch it. He advised the Turkish merchant to go on to Taibah, where he would find water. "No," said the Turk, "at Taibah the robbers would carry off all my slaves." The Arab forced the traveller to accompany him. At the moment of their departure, these unfortunates, losing the last ray of hope, uttered a piercing shriek. The Arab was affected, took one of the girls, poured some drops of water on her burning lips, and placed her on his camel, intending her as a present to his wife. The poor girl fainted repeatedly on passing the dead bodies of her companions. The small stock of water of the travellers was soon exhausted, when they discovered a well of fresh clear water. Here, disconcerted by the depth of the well, and the shortness of their rope, they tore their clothes into stripes, which they tied together, and with this frail cordage contrived to take up the water in small quantities, dreading the loss of their bucket, and the disappointment of their hopes. Through such perils and anxieties, they at last found their way to the first stages of Syria.[a]

As the two great rivers approach one another, particularly at Bagdat, where there is only a distance of a six hours journey between them,[b] the desert passes into an immense meadow, which only requires irrigation to yield prodigious harvests. This is the ancient Babylonia, formed, like the Delta of Egypt, by alluvial soil. Even to the people of the east, the heats of this country seem excessive.[c] The proximity of the mountains of Koordistan renders the winters cold. The flats are inundated by the Euphrates and the Tigris, which deposit no slime like the Nile: yet these natural irrigations might suffice to make the fields of Bagdat the garden of Asia. Here rice and barley formerly yielded a return of two hundred fold. The canals being at present neglected, the crops do not exceed one-tenth of what they were. Cotton is cultivated. The lemons and apricots are excellent. Indigo might undoubtedly succeed, and probably the sugar cane. There is a great want of trees. The date is the only one which ornaments the fields; the inhabitants live upon the fruit, cover their houses with the leaves, and make their posts of the trunks. Along the Tigris, springs of naphtha and bitumen are found in great number. The black bitumen serves instead of oil. The white, or naphtha, is esteemed a valuable drug.[d] They adhere to the ancient custom of pitching over with bitumen the vessels of willow basket-work in which they navigate the river. This substance is in such abundance, that it is allowed to flow into the Tigris, where, floating on the surface, it is sometimes set on fire by the boatmen, and exhibits the appearance of a burning river.

Bagdat, the second Babylon, the ancient residence of the Kaliphs, and the theatre of so many oriental tales, contains, at the present day, rather less than 80,000 inhabitants, of whom 50,000 are Arabs. Adorned with fine bazars, it has the air of a Persian rather than a Turkish city, but the streets are extremely dirty, and the houses destitute of elegance. The city, properly so called, is protected by a high wall. Manufactures of cotton cloths and velvets, together with the trade of India, contribute to the opulence of the inhabitants, whose manners preserve some remains of the politeness which distinguished the brilliant court of the Kaliphs.[e] A traveller remarks, with astonishment, that in this place there is no such thing as the slaughtering of oxen. The Turkish geographer informs us, that this arose from a law of the Abbassides, made for the encouragement of agriculture.[f] The pashâ of Bagdat, whose dominion extends from Bassora to Orfa, and from Sherzoor to the ruins of Babylon, can raise 50,000 soldiers, and yields but little submission to the Sublime Porte.

Below Bagdat, the ruins called Al-Modain, or the Two Cities, have attracted the attention of every traveller. One of them is unquestionably the ancient Ctesiphon; but the other, which lies on the western side of the river, is not Seleucia, as all the travellers affirm:[g] It is Koche, a fortress situated before[h] Seleucia, and which, according to the positive testimony of Arrian and Gregory Nazianzen, was different from Seleucia.[i] The ruins of the latter must be found three miles at least

[a] Voyages des Indes Orientales, par Carré. Paris, 1699. vol. I. Voyages de Pietro de la Valle, de Texeira, etc.
[b] Niebuhr, II. p. 292. Ives, p. 75, etc.
[c] Hadgi-Khalfah, p. 1240. Comp. Olivier, IV. p. 308, *sqq.*
[d] Niebuhr, Voyage, II. 336. Otter, l. I. cap. 14.
[e] Olivier, IV. 325. Rousseau, Description du pachalick de Bagdad. 1809.
[f] Djehan Numa, p. 1286. MS. translation.
[g] Pietro de la Valle, Olivier, Otter, etc.
[h] "Vis-a-vis." This cannot signify *opposite* Seleucia, as rendered by the English translator. It was on the same side of the river, (the western,) and being situated on the bank, it commanded the approach to Seleucia from the river. After the sack of Seleucia by the Romans, A. D. 165, from which that city never recovered, and the rise of Ctesiphon on the east bank, under the protection and patronage of the Parthian kings, Coche became a suburb of the latter city, and was all that remained of Seleucia in the time of Julian.—P.
[i] Mannert, Géographie des Grecs et des Romains, t. V. p. I. p. 397, 403, *sqq.*

from the Tigris, on a canal of communication between that river and the Euphrates. It is at Ctesiphon that we find the admirable ancient building, called Takt-Kesroo, which, according to the most general opinion, means the palace of Chosroes.[a] The whole country is strewed over with the ruins of Grecian, Roman, and Arabian towns, confounded in the same mass of rubbish. In the eighth century, the towns of Samarah, Harounieh, and Djafferik, formed, so to speak, one street of twenty-eight miles.[b] Their ruins, as seen by Tavernier, bear testimony to the truth of this account.[c]

None of these cities, however, made any approach in magnificence to the celebrated Babylon, the remains of which occupy a whole district in the environs of Helleh. Built of bricks cemented with bitumen, the buildings of this city, which, in the first century of the vulgar era, was a deserted place, cohering in large masses in their fall, have formed hillocks which the drifted earth collected by length of time has smoothed over and almost effaced. Daily, however, quantities of bricks are dug out bearing inscriptions; some in relief date from the Arabian era; others in hollow letters belong to the ancient Babylonians. These bricks are still the subject of many learned discussions.[d] Helleh, a flourishing manufacturing town, of considerable size, agreeably situated in a forest of palms, seems to be entirely built of bricks taken from the ruins of Babylon. The famous tower of Nimrod, a large square mass of ruinous walls, is six miles from Helleh; a circumstance which, when we consider the immense extent of Babylon, is not inconsistent with the belief that this is the ancient temple of Belus.

On the west of Helleh, there are two towns, which, in the eyes of the Persians, and all the Shiites, are rendered sacred by the memory of two of the greatest martyrs of that sect. These are Meshed-Ali and Meshed-Hossein, lately filled with riches accumulated by the devotion of the Persians, but carried off by the ferocious Wahabees to the middle of their deserts. In the same part of the country, the celebrated city of Kufa, the seat of a learned school which gave to the old Arabian characters the name of Kufic, has left very inconsiderable ruins. We know not the full extent of the lakes and morasses formed in this quarter by means of the canals connected with the Euphrates. Tavernier seems to have followed them farther west than any traveller of our times. There is, in the direction of the Euphrates, a long succession of morasses, or, as they are called in that country, *bethaïs*, in the midst of which is the village of Djamdeh, the capital of a race of people who worship the heavenly bodies, and consider themselves as the posterity of Seth.[e]

Descending the Shat-el-Arab, formed by the junction of the two rivers, we find the low countries covered by the tide, and thus rendered barren; the more elevated grounds forming a continued forest of palms.

Basra or Bassora, below the junction, may be considered as an independent Arabian state, which pays to the Grand Signior an uncertain homage. The city contains from 15 to 20,000 inhabitants. Its harbour forms a station of commercial intercourse between Europe and Asia. Here the different products of Europe and India are exchanged for those of Persia. It is the point of departure of the wealthy caravans which terminate their journey in the different cities of Asiatic Turkey.[f]

The Arabs of Bassora are very exact in preserving the genealogy, not only of their horses, but even of their pigeons and their rams. The latter are said to be distinguished by a white ring round the tip of the ear, a mark impressed by the fingers of the prophet on the first animal of the race.[g]

Divisions of the Countries on the Tigris and Euphrates.

Modern Divisions.	Chief Towns.	Ancient Divisions.	
Pashâlic of Kars.	Kars (Kartze)	Chorzene.	Armenia.
	Bayazid	Basenia.	
Pashâlic of Erzroom.	Erzroom (Arze)	Carina	
	Melazkerd	Malaza.	
	Ispir	Hisperatis.	
		Acilisene.	
	Arzen	Arzanene.	
	Taro	Tauranitium, &c.	
Pashâlic of Van.	Van (Iban)	Vaspuracania.	
	Ardgis	Arsissa.	
		Moxoène.	
		Bagravandene.	
Pashâlic of Diarbekir.	Diarbekir (Amida)	Sophène.	
	Merdin (Miredis)		
	Nesbin (Nisibis)	Mygdonia.	Mesopotamia.
		Anthemusia.	
Ancient Pashâlic of Orfa, (under Bagdad.)	Orfa (Edessa)	Osrhoène.	
	Charran (Charræ)	Chalcitis.	
	Racca (Nicephorium)	Gausanitis.	
		Ancobaritis.	
Pashâlic of Mosul.	Mosûl (Labbana?)	Acabene.	
	Irbil (Arbela)		
	Eski-Mosûl (Nineveh of the Romans?)	Assyria.	
Koordistân.	Bedlis	Corduene, Gordyene.	Assyria.
	Djezira	Gordynesia.	
	Giulamerk	Arapachitis.	
	Kara-Djolan		
	Amadia	Adiabene.	
Pashâlic of Bagdat.	Bagdat (Sittace?)	Sittacene.	Babylonia.
		Apolloniatis.	
	Helleh (Babylon)	Babylonia.	
	Bassora	Chaldæa.	

N. B. The obscurity in which the ancient and modern geography of the countries on the Euphrates is in some measure involved, does not admit of our giving synoptic tables in great detail; nevertheless, in order to prove that we have taken some pains to clear this part of geography from confusion, we present to the learned part of our readers the following essay upon the divisions of Armenia.

[a] P. de la Valle, Viaggi, lett. 17. Olivier, IV. 403.
[b] "7 *farsangs*."
[c] Hadgi-Khalfah, p. 1270. Tavernier, l. II. cap. 7.
[d] Beauchamp, Memoire, &c. Journ. des Sçavans, 1790. Hager, Mem. sur les inscriptions Babyl. Niebuhr, in Zach, Correspondence, VII. 433. where he corrects the views given in his Travels. II. 291.
[e] Hadgi-Khalfah, p. 1272.
[f] Olivier, IV. near the end.
[g] Hadgi-Khalfah, p. 1226.

VIEW FROM THE NORTH WEST ANGLE OF THE GREAT WALL OF BANDYLONG

W. Mercer del.

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DIVISIONS OF ARMENIA,

According to Armenian History composed by Moses of Chorené in the Fifth Century, compared with those known to the Greeks and Romans.[a]

Great Divisions or Provinces.	Small Divisions according to Moses.	Grecian and Roman Divisions.	Corresponding Modern Names.
I. Upper Armenia—at the head of the Euphrates.	Carina	Caranitis	Erzroom (territory.)
	Spera	Hisperatis	Isper (Town.)
	Derzane	Xerxene or Derxene[b]	To the south of Erzroom.
	Ekelesia	Akilisene	Egkelis.
	(And five others.)	Unknown	Unknown.
II. Armenia Quarta—stripe from Kars to Diarbekir.	Chorzene	Chorzene[c]	Kars.
	Hastiane	Astianene, Austanitis	Uncertain.
	Balahuwitia	Bolbene?	Idem.
	Zopha	Sophene	Part of Diarbekir.
	Shadacha	Soducène?	Uncertain.
	Hansita	Asetene, Ansitene	Uncertain.
	(And three others.)	Unknown	Unknown.
III. Alznia—on the Tigris.	Arzne	Arzanene	Arzen.[d]
	Nephercerta	Uncertain	Meiafarikin, town.
	(And eight others.)	Unknown	Uncertain.
IV. Turuberania—between the Murad and the lake Van.	Taron	Tauranitium[e]	Taro.
	Harkh	(Basilissene?)	Towards the sources of the Murad.
	Corchorunia	Uncertain	Hali-Carcara.
	Beznunia	Unknown	Upon lake Van.[f]
	(And thirteen others.)	Idem	Uncertain.
V. Moca—between the provinces III. and IV.		Moxoène	Moush, near lake Van.
	Ishensis	Isenchis[g]	Unknown.
	(And eight others.)	Uncertain	Idem.
VI. Corzæa—the north of Koordistan.	Corduza	Gordyeus, Corduene	In Koordistan.
	Atrovana	Atropatène Proper	In Adjerbidjan (in Persia.
	Garthunisia	Gordynesia	In Koordistan.
	Albacia	Unknown	Albak, town of Adjerbidjan
	(And four others.)	Idem	Uncertain.
VII. Persarmenia—a part of Adjerbidjan.	Maria	Marundæ[h]	Merend, (Persia.)
	Zarchuwan	Unknown	Zorova.
	(And seven others.)	Idem	Uncertain.
VIII. Vaspurcania—the Vaspurcan of modern maps, with a great part of Erivan.	Iban, capital[i]	Uncertain	Van.
	Argissakovita	Arsisa	Argis, Territory.
	Artazaca	Artaxata	Uncertain.
	Golthène	Colthène	Idem.
	Naxuana	Naxuana	Nachtchiwan.
	(And thirty-one others.)	Unknown	Uncertain.
IX. Synia—the Siunikh.		Unknown	Siunikh, a district to the south-west of lake Erivan.
	Sissacene	Sibacene?	Uncertain.
	(And nine others.)	Unknown	Idem.
X. Arsacha—to the south and east of lake Erivan.	Irania major	Uncertain	Erivan, called also Iran.
	Muchania	Idem	Moghan?
	(And twelve others.)	Idem	Uncertain.
XI. Phætacarania—to the south of the former.	Bagawene	Bagravandene	
	Aleuane[k]	Unknown	In Adjerbidjan.
	(And ten others.)	Idem	
XII. Utia—on the river Harpasu, the ancient Usis.[l]	Utia proper	Otene[m]	In Erivan.
	Schicassene	Sacassene	Uncertain.
	(And six others.)	Unknown	Idem.
XIII. Gugaria[n]—in Georgia.		Gogarene	Gurgistan.
	Colbophoria	Cholobetene	Unknown.
	Threlia	Uncertain	Trialetia, (Georgia.)
	Gangaria	Gangara[o]	Uncertain.
	Taschira	Unknown	Taschir, (Georgia.)
	Artavania	Idem	Artawand, (Georgia.)
	Zavachia	Idem	Zavach, (Georgia.)
	(And three others.)	Idem	Uncertain.
XIV. Taya—in Georgia?	Colba	Cholua[p]	On the Upper Koor.
	Asurta	Surta[q]	Idem.
	(And six others.)	Uncertain	Uncertain.
XV. Araratia—round Ararat.	Basenia	Unknown	Pasin-Sufla?
	Arsarunia	Idem	Upon the Araxes to the N. of Etschmiazin.
	Siracia	Idem[r]	Upon the Sanki.
	Bagrevanda[s]	Bagravandene?	Uncertain.
	Vanandia	Phanene?	Idem.
	Malaza	Uncertain	Melazkerd—town.
	(And fourteen others.)	Idem	Uncertain.

a Pliny says that Armenia was divided into 120 Strategiæ. VI. 9. and Ptolemy names twenty-one of them. Strabo and Tacitus also give some names. Moses of Chorene points out fifteen great provinces, and 187 sub-divisions; it appears to us almost certain that he has not given a just classification of the sub-divisions; and in that case all efforts to explain this distorted topography must fall to the ground; but the select results which we have extracted may elucidate both the ancient and modern geography, by showing their correspondence with each other.

b Xerxene, Strabo, p. 801. edit. Almel. Derxene, Pliny, V. 24.

c This is probably the Katarzene of Ptolemy; but the Chorzane or Chorzianene of Procopius, (de Ædif. II. 3. de Bello Pers. II. 24.) should be quite to the south of Armenia, by the side of Sophene. Mannert.

d A town on the Euphrates, different from Arzeroum or Erzroom. D'Anville. Euphrates and Tigris.

e Tac. Annal. XIV. 25.

f This lake bore the name of Beznunius, Mos. Chor. Hist. Arm. p. 31.

g Tac. Annal. XIII. 37

h Ptolemy places this people upon the lake of Urmia. (Wahl.)

i Cedrenus is the first who names this town Iban, pronounced Iwan, synonymous with Van.

k Notwithstanding the similarity of names, the position will not permit us to regard it as the Aluanis of Ptolemy on the Chaboras.

l MMS. of Pliny, VI. 9. (Mannert.)

m Pliny, VI. 13. Stephan. Byzant, *in voce.*

n From the position of the cantons known to belong to this province, we cannot avoid recognizing in Gugaria a corruption of Kurgin or Gurgistan, names given to Georgia. (Wahl.)

o A town of Albania. Ptolem. edit. of Erasmus.

p According to Ptolemy, a town on the southern branch of the Phasis; but this branch appears to be the upper part of the Koor or Cyrus.

q A town on the Phasis.

r The distances prevent us from placing here the Siraces, a people on the north of Caucasus.

s The position prevents us from recognizing in this canton the Bagravandene of the ancients, notwithstanding the resemblance of the names

BOOK XXVIII.

TURKEY IN ASIA.

PART III.

Syria and Palestine.

Those countries belonging to Asiatic Turkey which remain to be described, have so frequently attracted the attention of travellers, that a large library might be formed of the accounts of them which have been published. Two or three pages would scarcely contain the names of the pilgrims who have left journals of their travels in the Holy Land, works full of repetition and puerility, yet claiming the examination of the enlightened critic. From these, compared with the writings of Abulfeda and Josephus, the learned Busching has formed an excellent geographical treatise. In modern times we have judicious missionaries, such as Dandini; antiquaries, as Wood; and naturalists, as Maundrell and Hasselquist, who have ably elucidated particular parts of these countries. It was reserved for the genius of Volney to combine these detached accounts with the fruits of his own observation and study, so as to present the world with a complete description of Syria. As the nature of the present work does not admit of minute topographical descriptions, we may, in a general way, refer for such details to the researches of Busching and of Volney.

On the north-east, Syria is bounded by the Euphrates; on the north, by Mount Amanus, the modern Almadagh; on the west, by the Mediterranean; on the east, its deserts and those of Arabia are confounded, no constant frontier line having been pointed out either by the ancients or the moderns. Among the ancients, Palmyra, Damascus, and the Dead Sea, were the extreme points of this country. By the moderns, the ruins of Palmyra are considered as belonging to Arabia Deserta.[a] In the midst of a similar uncertainty on the south, a straight line drawn from the southern extremity of the Dead Sea to the mouth of the small stream of El-Arish, offers the only boundary that can be assigned between Syria on the one hand, and Arabia Petrea and Egypt on the other.

The original name given to this country by the inhabitants was *Aram*, whence the Arimi of Homer. The Arabs call it *Bar-el-sham*, "the shore on the left," in contradistinction to Yemen, or the country on the right. These denominations refer to the position of Mecca, and proceed on the idea that Syria forms a part of Arabia.[a]

The mountains of Syria are not all ramifications of Mount Taurus. Mount Rossus, a prolongation from Amanus, terminates at the valley of Orontes. Other heights skirt the Euphrates, and extend towards Palmyra. But the proper Syrian chain begins to the south of Antioch, by the huge peak of Mount Casius, which shoots up to the heavens its needle-like point, encircled with forests.[b] The same chain, under various names, follows the direction of the shore of the Mediterranean, being in general at no greater distance than twenty or twenty-four miles from the sea. Mount Libanus forms its most elevated summit. This chain, which extends between the parallels of Acre and of Tripoli, and the summit of which, called Hermon in Scripture, is between Damascus and Heliopolis, is divided into two, one on the west, which looks to the Mediterranean, and the other on the east, which bounds the plains of Damascus. This last received from the Syrian Greeks the name of Anti-Libanus, a name unknown among the natives, and which being employed somewhat arbitrarily by historians, has given rise to unprofitable discussions.[c] Libanus and all the mountains of Syria often imitate the ruins of towers and castles. They are composed of a calcareous rock, whitish, hard, and ringing when struck.[d] Granite scarcely begins to make its appearance till we come to the neighbourhood of Mount Sinai and the Red Sea. Near Damascus there are immense caverns, one of which is capable of containing 4000 men. The valley of Jordan offers many traces of volcanoes. The bituminous and sulphurous water of Lake Asphaltites, the lavas and pumice thrown out on its banks, and the warm bath of Tabarieh, show that this valley has been the theatre of a fire not yet extinguished. Volumes of smoke are often observed to escape from Lake Asphaltites, and new crevices are formed on its margin. Strabo says, that according to the local tradition of the country, the site of this lake was once occupied by thirteen flourishing and populous towns, which were swallowed up by an earthquake.[e] He states, however, that this catastrophe was ascribed by the philosopher Eratosthenes to a simple subsiding of the surface. The eruptions have long ceased, but earthquakes, which form to them a sort of interludes, still occur in this district. The coast in general is subject to them, and several instances are recorded in history, which have changed the appearance of Antiochia, Laodicea, Tripoli, Berytus, Sidon, and Tyre. So lately as 1759, one of them occurred,

[a] Herod. II. 12. [b] Ammian. Marcell. XXII. ch. 33.
[c] Reland, Palæstina. Busching, Asia, I. 245, *sqq.* Mannert, Géographie des Grecs et des Romains, VI. part I. 341, &c.
[d] Volney, Travels in Syria, I. 272.
[e] Strabo, XVI. p. 526. edit. Atrebat.

which was productive of extensive devastations. We are told that more than 20,000 lives were destroyed by it in the valley of Balbec. The losses thus occasioned are not yet repaired. It is observed that the earthquakes of Syria are almost wholly confined to the winter season after the autumnal rains.

The Orontes and Jordan both have their rise on Mount Libanus; the former runs to the north, the latter to the south. The Orontes is undoubtedly the first of the Syrian rivers; yet were it not for the numerous bars which dam up its waters, it would be completely dry in summer. The water thus retained requires the aid of machinery to raise it for the supply of the adjoining plains. Hence it has received the modern name of *Aasi*, or the Obstinate.[a] The Jordan, which Voltaire treats with contempt, is represented by Pliny the naturalist as a fine limpid river, large enough for the valley which it waters; and the same account is given of it by the greater part of travellers. Among the other rivers, which in general are only torrents, the Casmy or Casimir, to the north of Tyre, seems to be the Leontes of the ancients; the Nahar-el-kebir is the Eleutherus, the boundary of Phœnicia, where, according to a fabulous tradition, the Emperor Frederic Barbarossa perished.

The numerous transverse barriers which stop the waters of the Syrian rivers, give origin to many lakes. The valley of the Orontes contains the *Bahar-el-Kades* near Hems, the lake of Apamea, through which the river flows, and that of Antioch.

In the eastern and southern districts there are lakes without any outlet. Such are the lake of Acla, and that of old Aleppo, both of which are saline. The lake called El-margi, or the lake of the meadows, not far from Damascus, resembles the selenitic waters of the neighbouring mountains. The most celebrated of them all, lake Asphaltites, or the *Dead Sea*, has probably always been, as it now is, without any communication with the sea.[b]

Syria has three distinct climates. The summits of Libanus, covered with snow, diffuse a salubrious coolness through the interior; while the low maritime situations are constantly subjected to heat, accompanied with humidity; and the adjoining plains of Arabia Deserta are exposed to a dry and scorching heat. The seasons and the productions consequently vary. In the mountains, the order of the seasons very nearly resembles that of the middle of France; the winter, lasting from November to March, is sharp and rigorous. No year passes without falls of snow, which often cover the surface to the depth of several feet during entire months. The spring and autumn are agreeable, and the summer not oppressive. In the plains, on the contrary, as soon as the sun has passed the equator, a sudden transition takes place to overpowering heats, which continue till October. But, to compensate for this, the winter is so temperate, that orange trees, dates, bananas, and other delicate fruits, grow in the open air. Thus the space of a few hours forms the transition from spring to winter.[c]

If the advantages of nature were duly seconded by the efforts of human art, we might, in a space of twenty leagues, bring together in Syria the vegetable riches of the most distant countries. Besides wheat, rye, barley, beans, and the cotton plant, which are cultivated every where, there are several objects of utility or pleasure peculiar to different localities. Palestine abounds in sesamum, which affords oil; and in doura, similar to that of Egypt. Maize thrives in the light soil of Balbec, and rice is cultivated with success along the marsh of Haoulé. Within these twenty years, sugar canes have been introduced into the gardens of Saide and Bairout, which equal those of the Delta. Indigo grows without culture on the banks of Jordan, in the country of Basan, and only demands a little care to acquire a good quality. The hills of Latakié produce tobacco, which creates a commercial intercourse with Damietta and Cairo. This plant is at present cultivated in all the mountains. As for trees, the olive of Provence grows at Antioch and Ramli to the height of the beech. The white mulberry forms the riches of the country of the Druses, by the beautiful silks which are obtained from it: and the vine, raised on poles, or climbing the oaks, furnishes red and white wines, which might equal those of Bordeaux. Jaffa boasts her lemons, and her watermelons. Gaza possesses both the dates of Mecca, and the pomegranates of Algiers. Tripoli has oranges equal to those of Malta; Bairout has figs like Marseilles, and bananas like St. Domingo. Aleppo is unequalled for pistachio-nuts; and Damascus possesses all the fruits of Europe; apples, plums, and peaches, grow with equal facility on her rocky soil.[d] Niebuhr is of opinion that the Arabian coffee-shrub might be cultivated in Palestine.

Syria produces all our domestic animals, to which are added the buffalo and the camel. The gazels occupy the place of our deer: for wolves it has jackals, hyenas, and ounces, which last have sometimes been mistaken for tigers. None of these ferocious animals occasion ravages equal to those of the locust. An unusually mild winter generates this animal in swarms in the deserts of Arabia. Their armies, which darken the sky, descend on the plains of Syria. Grass, foliage, and every description of vegetation, are completely consumed in their track. The approach of these formidable swarms spreads universal terror, and their visit is followed by certain famine. The sole hope of the Syrian, under this calamity, is in a bird called *samarmar*, which devours the insects, and in the south-east winds, which drive them into the waters of the Mediterranean. There is a species of locusts which furnishes a tolerable article of food to man.[e]

Syria, successively invaded by the Persians, the Greeks, the Arabs, the Crusaders, and the Turks, presents a very mixed population. The original inhabitants, amalgamated with the Greeks, form a very small proportion of the whole. All civil and military employments are in the hands of the Turks. A great many Arabs are settled as cultivators. There are likewise

[a] Abulfeda, tab. Syriæ, p. 150. Kœhler's edition.

[b] A valley has been ascertained, by Burckhardt, to extend from the southern extremity of the Dead Sea, to the Gulf of Ailah in the Red Sea. It has decided appearances of having been originally the bed of a strait connecting the two seas. It is called the valley of Ghor at its N. extremity, but for the greater part of its length, the valley of Araba.—P

[c] Volney, I. 284, &c.

[d] Volney, II. 127, 153, 164, 230.

[e] Hasselquist, Travels in Palestine. Ludolf, Dissert. de Locustis, in Historia Æthiop.

many Bedouin or wandering Arabs, especially in the pashâlic of Damascus. In that of Aleppo there are hordes of Turcomans and Koords. The Druses, the Motoualis, the Ansarieh, and the Maronites, constitute small nations which will be particularly described in the proper place. The old Syrian language is only spoken in a few districts, chiefly in the neighbourhood of Damascus and Mount Libanus, and in less purity than in Mesopotamia, at Orfa, and at Harran.[a] The Arabic predominates both in the country and the towns. The Nabathean language is a corrupt mixture of Syriac and Chaldee, spoken by the peasantry or Nabayoth. Of the different Christian sects tolerated in this country, those of the Greek church are the most numerous. The nickname of Melchites, or royalists, which is given to them, recalls the bad policy of the Byzantine emperors, who intermeddled with theological disputes. The Jacobites have many adherents. The Maronites are connected with the church of Rome. The religion of the Druses, and still more that of the Ansarieh, consists of a mixture of old Syrian creeds, and some principles of the Mahometan system. The Motoualis follow the doctrines of Ali, which the Turks hold in detestation. In addition to these are the Chinganês or Bohemians;[b] and the Bedouin Arabs, who, if they have any religious principles, have at least no forms of worship. There are also some European Christians, Jews, Armenians, and Nestorians. In fact, no country furnishes a more ample collection of opposite religions. The different sects of Christians and Mahometans rival one another in the apparent fervour of their devotional zeal. This mass of population, so varied in their genealogy and their religious belief, are viewed as under the government of four Turkish pashâs. The pashâ of Aleppo has, within the boundaries of his government, hordes of Turcomans and Koords, who are scarcely at all subjected to him. That of Damascus pays to the sheiks of the Arab tribes, in the name of the Sultan, sums of money which have been presented to him in a piece of cloth; hence named *chourrah-es-sultân*, or Sultân's cloth.[c] In fine, the pashâs of Tripoli and of Seyde or Acre, have provinces almost entirely consisting of Maronites, Druses, and other independent tribes. The anarchy consequent on this political situation assumes different aspects, according to the character and conduct of the pashâs themselves, the emirs of the Druses, and the Arabian sheiks. Enterprising chiefs erect independent states for a moment: yet Syria always returns under the unsteady yoke of the Turks. The unhappy condition of the people continues unchanged. The agriculturist is continually pillaged by the authorized robberies of the pashâ, and the predatory attacks of the Arabs. The traveller can only have his choice of different bands of robbers for his escort. Art and industry languish for want of vigour and of information. Commerce, exposed to arbitrary vexation, is confined to timid bargains, or consigned to all the risks of caravans. Such is the deplorable condition of a country, rich in its soil, important in its local position, and which might, by a new crusade, be easily wrested from the grasp of its barbarous oppressors.

Let us examine now the most remarkable localities, beginning by the tract on the Euphrates, or the pashâlic of Aleppo. The city of this name, which, according to the Byzantine history, is undoubtedly the ancient Beræa,[d] has the superiority among the cities of Asiatic Turkey, both in the cultivated character of the inhabitants, in size, and in opulence. Its population is reckoned not to exceed 150,000.[e] The buildings are of hewn stone, with which also the streets are paved. The dark foliage of the cypress, forming a contrast with the dazzling whiteness of the numerous minarets, produces a highly picturesque effect. The silk and cotton manufactures are in a flourishing condition. The large caravans of Bagdat and of Bassora bring hither the productions of Persia and of India. Aleppo is the modern Palmyra. The environs, planted with vines and olives, produce wheat in great abundance; but the Arabs and Turcomans, living by plunder, carry off the property earned by the toil of the labourer. The water, being somewhat brackish, probably generates the slight complaint endemic in this place, called the *Aleppo boil.*[f g]

In ascending the river Kowaïk, which runs along the walls of Aleppo, and has no outlet into the sea, we find on the side of Mount Taurus the large city of Aintab, the houses of which, arranged in the form of an amphitheatre, form terraces, along which we pass by crossing over streets which are covered with glass.[h] This district is rich in apple trees and vineyards.[i] The Turkish is the only language spoken. At Bir, a small town a little to the east, is the common passage of the Euphrates. To the south of Bir are the ruins of Hieropolis, now known by the old Syrian name Mabog, which the Arabs pronounce Mambedge. The walls still standing, attest the ancient greatness of this city, sacred to the worship of the Phenician goddess Astarte, called in Scripture the queen of heaven, and the goddess of the Sidonians.[k]

The deserts which, in our day, extend from Aleppo and Mabog to Palmyra, were in former times subjected to cultivation, and formed the province of Chalybonitis, the capital of which, Chalybon, seems to differ from Aleppo.

The famous city of Antioch, once greater and richer than Rome itself, but often ruined, and finally razed by the Mamelukes in 1269, is now only a small town full of gardens, known by the name of Antakia. The port of Scanderoon, or Alexandretta, frequented by Europeans, has a most deadly climate. The pigeons of that place are celebrated over all the East. They were formerly employed as the carriers of dispatches to Aleppo, of which Alexandretta is the nearest harbour. The intermediate mountains are filled with towns and villages. In those of Kesfin and Martawan, the women carry their hospitality as far as those of Babylon of old. This authorized prostitution seems to be a remnant of old Asiatic

[a] Authors quoted in Adelung's Mithridates, I. p. 333—341.
[b] Olivier, Voyage dans l'Empire Ottoman, IV. 193.
[c] Seetzen, Annales des Voyages, VIII. 284.
[d] See the authors quoted by Harduin in his Notes on Pliny, V. 23.
[e] Seetzen in Zach, Correspondence, XI. p. 364.
Maundrell, Natural History of Aleppo. Olivier, IV. 178.
[f g] The distance from Aleppo to Constantinople, by the principal route, is 256 hours, or 512 Fr. leagues.—P.
[h] "Vitrage," glass-windows.
[i] Rauwolf, quoted by Busching.
[k] Pococke.

superstitions.[a] The yellow and white jessamines perfume the hills of Casius. We readily distinguish there two species of juniper,[b] which almost equal the cypress in height: the pines, the larches, the oaks, the box trees, the laurels, the yews, and the myrtles, conceal on every hand the aridity of the rocks.

Following the banks of the Orontes or El-Aasi, we find the remains of two cities formerly celebrated, Apamea, now Aphamieh, and Hems, the ancient Emesa, where a black stone was the object of adoration in a famous temple, of which no ruins are now to be seen. Hamath has regained the importance which it possessed in the times of the Hebrews. This commercial city was the native place of Abulfeda, an Arabian prince and geographer, who boasts much of the fertility and the high cultivation of the countries watered by the Orontes.[c]

From Hamath, or rather from Aphamieh, an ancient Roman road leads to Palmyra, the Tadmor of Solomon, and the residence of the immortal Zenobia, and the elegant Longinus. This ancient city is 180 miles[d] to the south-east of Aleppo, and an equal distance from Damascus, in a small district surrounded with deserts. The eye of the traveller is all at once arrested by a vast assemblage of ruins; arches, vaults, temples, and porticos, appear on every hand: one colonnade, 4000 feet long, is terminated by a beautiful mausoleum. Time has partially preserved the peristyles, the intercolumniations, and entablatures; the elegance of the design equals throughout the richness of the materials.[e] These magnificent ruins present a sad contrast with the hovels of wild Arabs, now the only inhabitants of a city which in former times emulated Rome. Every spot of ground intervening between the walls and columns is laid out in plantations of corn and olives, inclosed by mud walls. There are two rivers, the waters of which, when judiciously distributed, must have conduced greatly to the subsistence and comfort of the ancient inhabitants, but are now allowed to lose themselves in the sand.

Having taken a survey of those parts of Syria which lie on the Euphrates and the Orontes, we proceed to the sea shore, to the two pashâlics of Tripoli and Acre, comprehending Phœnicia and a part of Cœlosyria,[f] and some other little ancient divisions. The heat and moisture which render this country dangerous to European constitutions, maintain at the same time a rich vegetation; oranges, lemons, and pomegranates, form cheerful groves at the bottom of the mountains, which project in various directions, forming landscapes highly picturesque. Notwithstanding the want of cultivation, it is still what Ammianus Marcellinus calls it, "a country full of charms and graces." Ladikié or Latakié, the ancient *Laodicea-ad-mare*, is a flourishing commercial city; it exports tobacco. After being entirely ruined, it was rebuilt by a Turkish Aga.[g] It is thus a curiosity in its kind, indebted for its renewal to a race of people who usually confine their exertions to the work of destruction. The island of Ruad formerly contained the city of Aradus, the houses of which, like those of many towns in Europe, had five or six stories. Liberty and trade drew to it an immense population. At the present day the island is deserted, and presents not so much as a fragment of ruin, nor has tradition preserved any accounts of the spring of fresh water which the Aradians discovered in the middle of the sea.[h] Tripoli is named Tarabolos in the Turkish and Arabic languages. It is a very commercial city, though its harbour, like the others on this coast, is inconvenient and unsafe. It exports silks, cottons, and potash. Batroon and Djebil are the ports of the country of the Maronites; the latter is the ancient Byblos. A short way from this place is the river once named the Adonis, but now the Ibrahim-Pâsha, the waters of which are red, not with the blood of the favourite of Venus, but with the red-coloured earth which, at certain times of the year, they hold in suspension.[i] The ancient Berytus, now Bairut, is the place where the cottons and silks of the Druses are shipped. Here are to be seen the remains of an elegant palace built by the famous Emir Facardin.[k] The town, surrounded by splendid plantations of mulberry trees, enjoys a healthful climate.[l]

The ancient Sidon, mother of the Phenician cities, is now a town of 7000 or 8000 inhabitants, under the name of Seyde. It is the principal port of Damascus. The harbour, like all the others on this coast, was formed with much art, and at an immense expense, by means of long piers. These works, which still subsisted under the lower empire,[m] are now fallen to decay, and the port is filled with rubbish. The Emir Facardin, who dreaded the visits of the Turkish fleets, completed the destruction of the famous harbours of Phœnicia. A fate still more desolating has overtaken Tyre, the queen of the seas, the birth place of that commerce, which civilizes the world. Her palaces are supplanted by miserable hovels. The poor fisherman inhabits those vaulted cellars where the treasures of the world were in ancient times stored. A column, still standing in the midst of the ruins, points out the site of the choir of the cathedral consecrated by Eusebius.[n] The sea, which usually destroys artificial structures, has not only spared, but has enlarged, and converted into a solid isthmus, the mound by which Alexander joined the isle of Tyre to the continent. Acre, or St. Jean d'Acre, celebrated under this name in the history of the crusades, and in antiquity known by the name of Ptolemais, had, by the middle of the eighteenth century, been almost entirely forsaken, when Sheik Daher, the Arab rebel, restored its commerce and navigation. This able prince, whose sway comprehended the whole of ancient Galilee, was succeeded by the infamous tyrant Djezzar-Pashâ, who fortified Acre, and adorned it with a mosque, enriched with columns of antique marble, collected from all the

[a] See the memoir of Heyne, in the Annales des Voyages, XIII.
[b] Juniperus drupacea and oxycedrus of Linnæus.
[c] Abulfeda, Tab. Syriæ, 104, 108, etc.
[d] "67 Fr. leagues."
[e] Wood and Dawkins, on the Ruins of Palmyra.
[f] Volney, II. 156, 210, 329, &c.
[g] Maundrell's Journey from Aleppo, p. 11. Korte in Paul's Collection of Travels in the East, II. 131.
[h] Volney, II. 161. Yet Shaw, Maundrell, and Pococke, found some ruins.
[i] Lucian, de Dea Syria. Maundrell's Journey, p. 35.
[k] Fakr-ed-Din.
[l] Olivier, Voyage, II. 26.
[m] Achill. Tat. I. p. 1.
[n] Maundrell's Journey, p. 50. Euseb. Eccles. Hist. X. 4.

neighbouring cities. The harbour, which is filled up, was one of the best in this part of the Levant. In the history of modern warfare, it has acquired celebrity as the scene of a sanguinary struggle, in the years 1798–9, between the French army of the East under Bonaparte, and the troops belonging to a British squadron under Commodore Sir Sidney Smith, in which the latter, by their persevering bravery, proved successful in repressing the progress of that conquering force.

Leaving these burning shores, we now proceed to take a rapid survey of the mountainous country by which they are overlooked. That which extends from Antioch to the river, called Nahar-el-kebir, is inhabited by the Nassarians or Ansarieh, whom those who are best informed in the language and history of the east consider as a Mahomedan sect, founded in the seventh century by one Nassar,[a] but who, according to a passage of Pliny,[b] as pointed out by the judicious Mannert, appear to be an ancient Syrian race, who even under the Romans had a tetrarch of their own. It was in this same country that the crusaders found the famous nation called the Assassins, governed by the "old man of the mountain," a prince rendered formidable by the blind zeal of his subjects, who, at his command, put to death every person whom he designated as a victim, whom he scrupled not to select occasionally from the throne itself. When the Assassin himself lost his life in these bloody expeditions, he was led to retain the firm persuasion that the nymphs of Paradise, who were made known to him in a vision, held forth their arms to receive him to their celestial embraces. Burchard or Brocard, author of a well known book of travels in the Holy Land, traversed the country of the Assassins in the thirteenth century, and found it extremely fertile and highly cultivated.[c] It is not easy to come to an accurate conclusion amidst the different solutions which have been given of this enigma in history. We incline to believe with the learned M. Saci, that the name Assassin, derived from *hashish*, an intoxicating plant, had been given to an Arabian tribe among whom this plant was used to stimulate their courage. The old man of the mountain, means an Arab sheik, this word signifying an elderly person. It would still be practicable for an Arabian chief to employ the arm of a fanatical adherent for the murder of a monarch in the midst of his court, to gratify that bloody vengeance which forms a hereditary appetite in that nation. Such are the known facts. The rest is probably the offspring of imagination.

Next to the country of the Ansarieh, Mount Libanus raises its summits to the clouds, still shaded by a few cedars, and beautified with thousands of rare plants. Here the *Anthyllis tragacanthoides* displays its clusters of purple flowers. The pink of Libanus,[d] the mountain amaryllis, the white and the orange lily, mingle their brilliant hues with the verdure of the birch-leaved cherry.[e] The snow of the mountain is skirted by the *Xeranthemum frigidum*. There is but little variety in the rocks of this great Syrian chain. They chiefly consist of a brown calcareous stone. In the valleys we meet with argillaceous schistus, trap, and friable sandstone. Puddingstone, and frequently calcareous conglomerates, are also met with. A piece of yellow amber has been found here imbedded in a hard calcareous rock. Nitre is abundant; alum and vitriols are less frequent. The only metal found is iron.[f] The deep ravines of these mountains are watered by numerous streams, which arise on all sides in great abundance.[g] The highest of the valleys are covered with perpetual snow. Arvieux and Pococke found the snow lying here in the month of June; Rauwolf and Kort in August. But it does not appear certain that any of the peaks are covered with a cap of snow. The coolness, the humidity, and the good quality of the soil, in the valleys, maintain here a perpetual verdure. These bounties of nature are protected by the spirit of liberty. It is to an industry less harassed by predatory encroachments than that of the other districts of Syria, that the hills of Lebanon owe those fine terraces in long succession, which preserve the fertile earth; those well planted vineyards; those fields of wheat, reared by the industrious hand of the husbandman; those plantations of cotton, of olives, and of mulberries, which present themselves every where in the midst of the rocky steeps, and give a pleasing example of the effects of human activity.[h] The clusters of grapes are enormous, and the grapes themselves as large as prunes. Goats, squirrels, partridges, and turtle-doves, are the most numerous animals. All of them become a frequent prey to the pouncings of the eagle, and the prowlings of the panther. This last is the animal which is here called the tiger.[i] These retreats, secured from warlike invasion, but unfortunately accessible to the intrigues of Turkish pashâs, are inhabited by two races, differing in religion and in manners, but similar in their love of independence, the Maronites and the Druses.

The country of the former is called Kesraooan, the Castravan of the historians of the crusades. It reaches from the river Kebir to the Kelb. The Maronites, amounting to 120,000, dwell in villages and hamlets. The convent Kanobin, the residence of their patriarch, may be considered as their capital. They export their own corn, their wine, and their cotton, by Tripoli and Djebil. Distinguished into two classes, the common people and the sheiks or upper ranks, they all cultivate the ground with their own hands; all live economically in the bosoms of their virtuous families, under a rustic roof, where the Christian traveller uniformly meets with a hospitable reception.

The ringing of bells, and the display of processions, proclaim the liberty enjoyed in this district by the Christian worship. There are 200 convents, in which the discipline of St. Anthony is rigidly observed. There are numbers of individuals who lead the lives of hermits

[a] Tyschen's Memoir on the Nassarians, in the Memorabilia of Paulus, IV. Niebuhr's Travels. Catéchisme des Druses, in Eichhorn, Répertoire Oriental, XII. 129, 174.

[b] Apamiam Marsyâ amne divisam à Nazarinorum Tetrarchiâ. Plin. V. 23.

[c] Burchard, Descriptio Terræ Sanctæ, in fine.

[d] Dianthus Libanotus.—P.

[e] Prunus prostrata.

[f] Seetzen, Correspondence de Zach, XIII. 551.

[g] Korte's Travels in Palestine, in German, p. 458.

[h] Dandini's Travels in Mount Libanus, (French translation) p. 76—80.

[i] Schulze, dans Paulus, Collect. des Voyages, VII. 202.

in the caverns of the mountains.[a] The Maronites, though connected with the Roman Church, having renounced the heresy of Maro their founder, maintain the old institution of marriage among their priesthood. The fervour of devotion which pervades this people recalls to us the ideas of the primitive church. An affecting superstition has consecrated a cedar forest, which is said to have furnished the timber of Solomon's temple. Only twenty large cedars remain, and this ancient race verges fast to its extinction.[b] Every year, on transfiguration day, the Greeks, the Armenians, and the Maronites, celebrate a mass on an altar of rough stones raised at the roots of these venerable trees.[c]

The Druses, also 120,000 in number, live to the south of the Maronites. Their country has several subdivisions, differing from one another in their soil and productions. Matné, on the north, has rich iron mines in the midst of its rocks. Garb, next in order, has fine forests of firs. Sahel, or the flat country adjoining the sea, produces mulberries and vines. Choof, in the centre, is distinguished by silks of a superior quality. Tefa, or the apple district, is on the south. Chagif excels in tobacco. The highest and coldest region is called Djoord; to this the shepherds retire with their flocks in summer.[d] The Emir, or prince of the Druses, resides in a town called Deir-el-kamar,[e] in the subdivision of Choof. It is by religious peculiarities that this people is separated from the other inhabitants of Syria. Long unknown to Europeans, kept exclusively in the hands of the Okals or teachers, their system is now known by the publication of some doctrinal books in the Arabic language, the style of which is remarkably obscure.[f] The Druses believe in one God, who for the last time showed himself in human form in the person of Hakem, Caliph of Egypt, in 1030. Persuaded that all other systems of belief will finally be united in that which they profess, they regard them all with equal indifference, although the Christians have considered them as entertaining a marked contempt for the Mahometan religion. This system of deism has some traces of doctrines of a more remote antiquity, such as the transmigration of souls, and the worship of a calf,[g] whence it has been judiciously conjectured that the Druses, as a political body, existed prior to the time of the Caliph Hakem and his prophet Hamzah. This conjecture assumes a character of great probability, when we compare the passages in which the Hebrews mention a nation of *Iturs*,[h] those in which the Greeks and Romans celebrate the invincible bravery of the *Ituræi*, who were the masters of Libanus from Berytus to Damascus,[i] and the testimony of a modern traveller, according to whom, the real name of the Druses is *Durzi*, or *Turzi*.[k] Hence we are induced to think, that the ancient Ituræi have always maintained a sort of political independence in the midst of the revolutions of Syria, and that the doctrines of Hakem only gave fresh energy to a society already existing. Whatever credit this hypothesis may receive, the Druses, though a small body, are the only race in the Turkish empire that gives a good specimen of the dignity of human nature. Republicans in austerity of manners, always either dreaded as rebels or respected as free vassals by the neighbouring pashâs, they acknowledge the authority of a hereditary prince. Several families enjoy peculiar honours, but a noble simplicity gives them a unity of character in the social state. Invincible in the mountains, they are ignorant of the art of fighting in the plain. Their fidelity is equal to their courage; they never prove treacherous to the unfortunate who throws himself on their protection; but they fail not to revenge blood by blood; and the satellites[l] of their emirs have, like those of the assassins of old, been known to inflict death on the enemies of their masters in the midst of populous cities.[m] Jealousy respecting females is carried among them to an extreme. An inviolable veil screens from all profane curiosity the attractions of their women, who are said to be very handsome, and actuated by the lofty sentiments of the dames of Lacedemon. The husband cannot listen without uneasiness to any encomiums passed upon his wife, and any animated eulogy from the mouth of a stranger exposes the Drusian lady to the danger of death itself.[n] Agriculture and politics form the subject of conversation among the Druses, when collected round the doors of their cottages; the children themselves listen in silence to the rustic assembly, and, untaught to read, devote themselves with enthusiasm to warlike exercises.

The Motualis, first mentioned by Arvieux,[o] occupy the great valley which divides the two principal chains of Libanus, the easternmost of which is called by some of the moderns Anti-Libanus. These are ancient Syrians who have embraced the doctrines of the Mahometan Shiites. The respect which they manifest for the Caliph Ali almost amounts to religious worship. Governed, like the Druses, their habitual rivals, by sheiks and emirs, they render themselves formidable to the Turks. Their cavalry was once considered as invincible; but they have been singularly weakened by intestine discord. In their country Balbec is situated, a town containing 5000 souls, and which is, as it were, buried among the ruins of the ancient Heliopolis. The porch of the temple of the sun, though disfigured by two Turkish towers, is of exquisite beauty. The stone of which the temple is built was brought from a neighbouring quarry, at the bottom of which there is a single stone still lying, sixty-six feet in length, fourteen in breadth, and fourteen feet six inches in thickness.[p]

[a] Dandini's Travels in Mount Libanus, passim.
[b] Bellonius, in 1550, makes them twenty-eight. Rauwolf in 1575, twenty-four. Thevenot and others in 1660, make them twenty-three. Maundrell in 1696, sixteen. Pere Queux in 1721, twelve. Schultz in 1755, makes them twenty.
[c] Korte, p. 421. Dandini, p. 75.
[d] Volney's Travels, II. 173. [e] House of the moon.
[f] Alder, Musæum Kuficum Borgianum, (Rome) 1782. Eichhorn's Repertory, XII. art. 4. Adler, ibid. XV. 8. Bruns' Dissertation, XVII. 2. Paul. Memorab. I. 8, 9. Venture, in the "Annales des Voyages," IV. 325. *sqq.*
[g] Mariti Istoria de Facardino. Niebuhr's Travels.
[h] Chron. I. cap. 1. v. 3. cap. 5. v. 19. Josephus, XIII. 19.
[i] Plin. V. 23. Strabo, XVI. p. 1093—1096. Cic. Philip, II. 8-44. Dion. Cass. XXXIX. 5-59. Appian. Bell. Civ. V. 10.
[k] Niebuhr.
[l] "Fedarieh."
[m] Venture, Ann. des Voyages, IV. 345.
[n] Niebuhr and Arvieux.
[o] Though Volney says otherwise, II. 79.
[p] "70 feet long—14 feet broad—14 feet 5 in. thick, Fr. measure."

Blocks of this size show the grandeur of the architecture of the edifices for which they were employed.

At the eastern base of Libanus is the fertile plain watered by numerous streams, where the ancient city of Damascus stands, the Demeshk, or Sham-el-Demeshy of the orientalists. This city was once famous for the manufacture of sabres, which appear to have been made of thin laminæ of steel and iron welded together so as to unite great flexibility with a keen edge. The art of making them is lost, since Tamerlane carried off the artisans to Persia. Sabres are still made here, but of an inferior quality. It has a manufacture of excellent soap, and of stuffs made of a mixture of cotton and silk. The cabinet-work of fine wood, adorned with ivory and mother of pearl, has excited the admiration of Europeans.[a] This city is enlivened by the bustle of commerce, and the passage of the caravans to Mecca. The great street which crosses it presents two rows of shops, in which the riches of India glitter along with those of Europe.[b] Its population may amount to 100,000. The private houses of Damascus, simple in external appearance, exhibit in the interior all the splendour and elegance of a refined luxury; the floors are of marble; alabaster and gildings are displayed on every side. In every great house there are several fountains playing in magnificent basins.[c] The smallest house has three water pipes, one for the kitchen, another for the garden, and a third for washing. The same magnificence is displayed in the mosques, the churches, and the coffee-houses. The Chan-Verdy, or Coffee-house of Roses, is considered as one of the curiosities of the Levant. The environs of the city, watered by the Barrady and other small streams, present at all seasons of the year a pleasing verdure, and contain an extensive series of gardens and villas. The valley of Damascus or Gutha is, according to Abulfeda, the first of the four terrestrial paradises.[d e] But beautiful places are often inhabited by unworthy people. The citizens of Damascus are accused of fanaticism by the Christians, and of perfidiousness by the Mussulmans. The Arabs have three proverbial characters for the three great cities on the confines of Arabia, expressed in a kind of rhyme; and signifying, the Damascans are false and traitorous, the Aleppans foppish idiots, and the people of Cairo a set of vindictive wretches.[f] But a recent traveller, Seetzen, contradicts this unfavourable account of the Damascans. The pashâlic of Damascus is in a much more flourishing condition than those of Aleppo and of Acre. Yusuph Pasha lately governed it with a paternal sway, but was displaced by the Porte for not duly remitting the revenue, and succeeded by another who also holds Acre, and who, though bred under the brutal Djezzar, is said to be a well disposed man.

Ancient Palestine, and the small provinces which have generally belonged to it, remain to be considered. To the south of Damascus lie the countries called by the ancients Auranitis and Gaulonitis, by the moderns Haurân and Chaulân, consisting of one extensive and noble plain, bounded on the north by the ancient Hermon, the modern Djibel-el-Shech; on the south-west by Djibel-Edj-loon; on the east by Djibbel Hauran. In all these countries there is not a single stream which retains its water in summer. The most of the villages have their pond or reservoir, which they fill from one of the *wadi*, or torrents, in the rainy season. Of all the countries of Syria, Hauran is the most renowned for the culture of wheat. Nothing can exceed in grandeur the extensive undulations of their fields moving like the waves of the ocean in the wind. This plain contains many scattered hummocks, the sites of villages either inhabited or deserted. All these hummocks, all the round stones found in the fields, all the building stones, and the whole mountain of Hauran, consist of basalt. The houses being entirely built of this stone, even to the doors, present rather a sombre appearance.[g] The ancient Bostra, the capital of Roman Arabia in the third century, preserves its name, but is now in ruins.

The district of Bothin, the ancient Batanea, contains nothing except calcareous mountains, where there are vast caverns, in which the Arabian shepherds live like the ancient Troglodytes. Here their she-goats come spontaneously to be milked; and the burning trunk of a tree serves them both for light and heat. Here a modern traveller, Dr. Seetzen, in 1806, discovered the magnificent ruins of Gerasa, now called Djerash, where three temples, two superb amphitheatres of marble, and hundreds of columns, still stand, among other monuments of Roman power. The finest thing that he saw was a long street, bordered on each side with a row of Corinthian columns of marble, and terminating in a semicircular open space, surrounded with sixty Ionic columns.[h] This discovery confirms the opinion of Mannert, that Gerasa had a more southerly situation than that assigned to it by d'Anville. The mountains of Edjloon, the ancient Gilead, bear oaks which produce gallnuts. The inhabitants of the town of Es-szalth, the capital of El-belka, the ancient Peræa, are subject to no master. Their country presents on its numerous terraces a mixture of vines, olives, and pomegranates. Karak-Moab, the capital of a district corresponding to that of the ancient Moabites, is to be distinguished from another Karak in Arabia Petræa. The countries now described are to the east of the river Jordan.

This river, in the higher part of its course, forms the boundary between the country of Chaulan and the fertile and beautiful Galilee, which is identical with the

[a] Schulze, Voyage, in Paulus's Collection, VII. 174.

[b] Nouveaux Mémoires des Missions de la Compagne de Jésus, VI. 127, &c.

[c] Maundrell's Journey from Aleppo to Jerusalem, p. 125. sixth edition. Schulze, in the Collection of Paulus, VII. 177, &c.

[d] Abulfeda, tab. Syriæ, p. 100.

[e] Damascus, according to Buckingham, is three miles long, by two broad. It is bounded to the N. E. by a ridge of hills, and on the opposite side by a plain extending beyond the reach of vision. The houses have their first story of stone, and their upper part of yellow brick, and are besides very gaily painted. In the centre of the city, is the castle, an extensive fortress, and the grand mosque. The bazaars are extensive, and arched over; they are constantly open from 10 o'clock A. M. to 2 P. M. On the N. E. on the slope of the hills, the city is surrounded by kiosks and gardens; on the E. by several villages; on the S. W. by olive groves, and avenues of planes and poplars, stretching far into the plain; and on the W. by the large suburb of Salhayah. In the vicinity of the city are several burying grounds, shaded with cypress. The tombs are ornamented with wreaths, and sprigs of myrtle, which the relatives are in the habit of frequently watering.—P.

[f] "Shami shoumi, Halebi tshelebi, Maseri harami." Schulze, in Paulus, p. 170.

[g] Seetzen, Annales des Voyages, I. p. 398, first edition, (410, 2d edition.)

[h] Seetzen, correspondence de M. Zach, XVIII. 425.

modern district of Saphet.[a] The town of this name is said to be the same with the ancient Bethulia which was besieged by Holofernes; it is situated on a hill, at the bottom of which myrtle groves extend on all sides.[b] Tabarya, an insignificant town, occupies the situation of Tiberias, which gave its name to the lake, which also went by that of Gennesareth or the Sea of Galilee. Date trees, orange trees, and indigo plants, surround this picturesque piece of water; but no fishing boat is employed here, though the fish are in great abundance.[c] Nazareth, where Jesus Christ was brought up, is a middle sized town. Six miles to the south of Nazareth stands the hill of Tabor, forming a pyramid of verdure; olives and sycamores crown its summit, which also contains a plain covered with wild wheat. It was called Itabyrius by some of the ancients.[d] From the top of this mountain, which a venerable tradition assigns as the scene of the transfiguration of Christ, we look down on the river Jordan, the lake of Gennesareth, and the Mediterranean.[e] Galilee would be a paradise were it inhabited by an industrious people under an enlightened government. Vine stocks are to be seen here a foot and a half in diameter, forming by their twining branches vast arches and extensive ceilings of verdure. A cluster of grapes two or three feet in length, will give an abundant supper to a whole family.[f] The plains of Esdrelon, and all the other districts which afford pasture, are occupied by Arab tribes, around whose brown tents the sheep and lambs gambol to the sound of the reed, which at night-fall calls them home.[g] Of late years this whole neighbourhood has groaned and bled under the malignant genius of Djezzar Pashâ. The fields are left without cultivation, and the towns and villages are reduced to beggary. In the districts which come next in order, Dr. Clarke remarked a happy change of aspect, as they were subject to the more humane sway of the Pashâ of Damascus.

The ancient Samaria comprehends the districts of Areta and Nablous. In the former, to the north of the oak forest, anciently called Saronas, we find the remains of Cesarea; and on the gulf of St. Jean d'Acre, the town of Haïffa, or Caïffa, where there is good anchorage for ships. On the south-west of this gulf a chain of mountains extends, the promontory of which, in particular, is known by the name of Carmel, a name famous in the annals of our religion. There, we are told, the prophet Elijah proved by miracles the divinity of his mission. There thousands of religious Christians once lived in caves of the rock: the mountain was then wholly covered with chapels and gardens. At the present day nothing is to be seen but scattered ruins amidst forests of oaks and olives, the verdure of which is interrupted by the whiteness of the calcareous rocks.[h] The heights of Carmel enjoy a pure and enlivening atmosphere, while the interior of Galilee and Samaria is often obscured by dry fogs.[i]

The city of Nablous, the ancient Neapolis of the age of Herod, but better known by the primitive name of Sichem, contains, in houses which make but little appearance, a considerable population for so desert a country. The Samaritans, called Semri in Arabic, still worship the Deity on the verdant heights of Gari zim.[k] They have forgotten their ancient language, which was a dialect of the Hebrew. Six miles farther north, the ruins of Samaria are covered with orchards. The country produces abundance of wheat, silks, and olives.[l]

Judea, properly so called, comprehends the modern district of Gaza, or the ancient country of the Philistines, that of Khalil or Hebron, and that of El-kods, or Jerusalem. In the first, besides Gaza, the chief town, we remark the celebrated port of Jaffa,[m] corresponding to the Joppa of antiquity. Fortified and dismantled in frequent alternation, this town is variously described in books of travels. It is here that the pilgrims land on their way to Jerusalem. If Judea were well cultivated, the exports of cotton from Jaffa might be considerable.

The soil, consisting of a sandy earth, rises from Jaffa towards the mountains of Judea, forming four ascending terraces.[n] The sea-shore is lined with mastic trees, palms, and prickly pears.[o] Higher up, the vines, the olives, and the sycamores, repay the labour of the cultivator; natural groves arise, consisting of evergreen oaks, cypresses, andrachnés and turpentine trees. The ground is covered with rosemaries, cistuses, and tuberoses. The vegetation of these mountains is compared by Pierre Belon to that of Ida in Crete.[p] Other travellers have dined under the shade of a lemon tree as large as one of our largest oaks, and have seen sycamores, the foliage of which was sufficient to cover thirty persons along with their horses.[q]

The wine of St. John near Beth-lehem is delicious. The wild olive trees near Jericho bear olives of a large size, and give the finest oil.[r] In places subjected to irrigation, the same field, after a crop of wheat in May, produces pulse in autumn. Many of the fruit trees are continually bearing flowers and fruit at the same time in all their stages. The mulberries, planted in straight rows in the open field, are festooned by the tendrils of the vine.[s] If this vegetation seems to languish or become extinct during the extreme heats; if in the mountains it is at all seasons somewhat detached and interrupted; such exceptions to the general luxuriance are not to be ascribed simply to the general character of all hot and dry climates, but also to the state of barbarism in which the great mass of the present population is immersed.

Still some remains are to be found of the walls which they built to support the soil on the declivities; the

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[a] *Safad.*
[b] Schulze, in the collection of Paulus, VII. 60.
[c] Seetzen, ibid. 349.
[d] "*Atabyrion.*"
[e] Maundrell's Journey, p. 115. Nau, Della Valle, &c. &c.
[f] Schulze, in Paulus, VII. 102.
[g] Id. ibid. p. 68.
[h] Phil. a Sancta Trin. Itiner.
[i] Schulze, in Paulus, VII. 55.
[k] Maundrell's Journey, p. 60.
[l] Volney, II. 278.
[m] Pronounced Yaffa, "*Iafa.*"
[n] Chateaubriand, Itineraire de Jerusalem, II. 129—135, &c.
[o] "Nopals," *cactuses.*
[p] Pierre Belon, Observ. de singularités, p. 140. Hasselquist's Travels in Palestine, p. 535, 550, 568, &c. (in German.)
[q] Schulze, in Paulus, VI. 278. VII. 34.
[r] Schulze's Travels, or the Ways of the Almighty, &c. II. 86, 135 (in German.)
[s] Korte's Travels in Palestine, p. 187, (German.) Hasselq. passim

remains of cisterns, in which they collected the rain water; and traces of the canals by which these waters were distributed over their fields. These labours necessarily created a prodigious fertility under an ardent sun, where a little water was the only requisite to revive the vegetable world. The accounts given by the ancients of the fertility of Judea, collected by the Abbé Guénée, are not in the least degree falsified by the present state of things. "The case," as Belon observes, "is exactly the same with the islands of the Archipelago; a tract from which a hundred individuals draw a scanty subsistence, formerly maintained thousands." Moses might justly say that Canaan flowed with milk and honey. The flocks of the Arabs still find in it succulent pastures, and the wild bees hoard up in the holes of the rocks a fragrant honey, which is sometimes seen flowing down their surface. Nor did the ancients, and particularly the Hebrew writers, neglect to notice the dryness and sterility of particular parts, such as the central chain of Judea, and the desert which extends from these mountains eastward to the Dead Sea. Here, both ancients and moderns tell us they have found nothing but stones, sand, ashes, and a few thorny shrubs. Belon had already remarked this contrast between the two sides of the chain of Judea.

"As we approach the centre of Judea," says a celebrated writer, "the sides of the mountains enlarge and assume an aspect at once more grand and more sterile; by little and little the vegetation languishes and dies; even mosses disappear; and a red and burning tint succeeds to the whiteness of the rocks. In the centre of the mountains, there is an arid basin, inclosed on all sides with yellow pebble-covered summits, which open only to the east, where the surface of the Dead Sea and the distant mountains of Arabia present themselves to the eye. In the midst of this rocky landscape, encircled by a wall, we perceive extensive ruins, scanty cypresses, bushes of the aloe and the prickly pear; some Arabian huts, resembling whitewashed sepulchres, are spread over this heap of ruins. This spot is Jerusalem."[a] This touching description of the holy city, as it existed in the third century, is closely applicable to its modern condition. Though peopled with 20 or 30,000 inhabitants, according to the varying estimates of travellers, this city is described by many who have visited it as presenting to the view nothing but ruinous buildings, resembling prisons rather than houses. Their interior, however, is allowed to be richer than the external aspect would lead us to believe. Dr. Clarke, one of its latest visitants, says, that at the first view he was struck with its grandeur; that instead of a wretched and ruined town, as he had expected, he beheld a flourishing and stately metropolis, domes, towers, palaces, and monasteries, shining in the sun's rays with inconceivable splendour. Like many other ancient places, it, no doubt, presents two aspects, a mixture of magnificence and paltriness. On the whole, Jerusalem appears to be at the present moment in a state of progressive improvement. There are three convents in it, belonging to the Latins, the Greeks, and the Armenians, resembling strong castles. On the site of the temple of Solomon stands the Mahometan mosque, a fine building, in the centre of a beautiful square; but Christians are not allowed to approach, and much less to enter it. The church of the holy sepulchre inclosed within its magnificent but irregular walls the place where the cross of Jesus Christ was set up, and the tomb in which his body was deposited. A Turkish guard levies the tax imposed on the pious pilgrim, on visiting the memorable spot where the great Founder of Christianity confirmed his divine morality by his death. A conflagration has recently laid in ruins this common sanctuary of the Christian nations; but the cenotaph which covers the entrance of the tomb has resisted, as if by a miracle, the fall of the burning cupola.

Few cities have undergone so many revolutions as Jerusalem. Once the metropolis of the powerful kingdom of David and of Solomon, its temples were built of the cedar of Lebanon, and adorned with the gold of Ophir. After being laid waste by the Babylonians, it was rebuilt in more than its original beauty under the Maccabees and the Herods. The Grecian architecture was now introduced, as is shown by the royal tombs on the north of the city.[b] It then contained some hundred thousands of inhabitants; but in the year 70 of the Christian era, it was visited by the signal vengeance of heaven, being razed to the foundation by the Roman Titus. Adrian built in its stead the city of *Ælia Capitolina;* but in the time of Constantine, the name of Jerusalem was restored, and has ever since been retained. Helen, this emperor's mother, adorned the holy city with several monuments. In the seventh century it fell under the power of the Persians and Arabians. The latter called it El-Kods, "the holy," and sometimes El-Sherif, "the noble." In 1098, the chevaliers of Christian Europe came to deliver it from the hands of the Mahometans. The throne of the Godfreys and of Baldwin imparted to it a momentary lustre, which was soon effaced by intestine discord. In 1187, Saladin replaced the crescent on the hills of Zion. Since that period, conquered at different times by the sultans of Damascus, of Bagdat, and of Egypt, it finally changed its masters, for the seventeenth time, by submitting in 1517 to the Turkish arms.

Bethlehem, where Jesus Christ was born, is a large village, inhabited by Christians and Mussulmans, who are actuated by an equal spirit of dislike to the existing government. The reputed locality of the sacred manger is occupied by an elegant church, ornamented by the pious offerings of the whole of Europe. It is not our intention to enter on a minute critical discussion of those old traditions by which the particular places rendered sacred by the Saviour's presence are marked out. They present much uncertainty, mingled with truth. No credit certainly is due to the story in which the city of Hebron, called in Arabic Khalil, claims the possession of the tomb of Abraham, and attracts on this account the veneration both of Christians and Mahometans. Hebron, situated to the south of Jerusalem, in a country less arid, contains from 1000 to 1200 inhabitants, has some pretty manufactures of glass, and exports a great quantity of *dibsé*, a sort of sugar

[a] Chateaubriand, les Martyrs, liv. 17. vol. III. p. 99, 3d edition

[b] Chateaubriand, Itineraire, II. 351—362.

obtained from the grape.[a] To the north-east of Jerusalem, in the large and fertile valley called El-Gor, which is watered by the Jordan, we find the village of Rihha, the ancient Jericho, called by Moses the city of palms. This is a name to which it is still entitled; but the groves of opobalsamum, or the balm of Mecca, have disappeared; and the environs of this city are no longer adorned with the flowers of the *anastatica hierochuntica*, to which an error, founded in superstition, has given the appellation of Jericho roses.

To the east of Judea, two rude and arid chains of mountains encompass, with their dark steeps, a long basin, formed in a clay soil, mixed with bitumen and rock salt. The waters of the Dead Sea, which occupy this basin, hold in solution a quantity of the sulphate of lime, and the muriates of lime, magnesia, and soda, equal to one fourth of their weight.[b] The asphaltum, or bitumen of Judea, rises from time to time from the bottom, floats on the surface of the lake, and is thrown out on the shores, where it is gathered for use. Formerly the inhabitants were in the practice of going out in boats or rafts to collect it in the middle of the lake. None of our travellers have thought of sailing on this lake, which would undoubtedly contribute to render their acquaintance with its phenomena more complete. We are told by the greater part of those who have visited it, that neither fish nor shells are to be found in it, that an unwholesome vapour is sometimes emitted by it, and that its shores, frightfully barren, are never cheered by the note of any bird. The inhabitants, however, are not sensible of any noxious quality in its vapours; and the accounts of birds falling down dead in attempting to fly over it are entirely fabulous. We are taught to believe that the site of the Dead Sea was once a fertile valley, partly resting on a mass of subterranean waters, and partly composed of strata of bitumen; that a fire from heaven kindled these combustible materials, the fertile soil sunk into the abyss beneath, and Sodom and Gomorrah, and other cities of the plain, probably built of bituminous stones, were consumed in the tremendous conflagration. In this manner the amateurs of physical geography contrive a scientific explanation of those awful changes of which, according to the Scriptures, this place was once the scene.[c]

TABLES

OF THE

SUBDIVISIONS OF SYRIA AT DIFFERENT PERIODS.

TAB. I.—*Under the Romans in the three first centuries.*

Greater Divisions.	Subordinate Divisions.	Chief Towns.
Syria Superior. (Upper Syria.)	Comagene	Samosata.
	Cyrrhestica	Cyrrhus. Beræa, (Aleppo.) Hierapolis.
	Pieria	Alexandria.
	Seleucis	Seleucia.
	Antiochene	Antiochia.
	Casiotis	Laodicea ad mare.
	Apamene	Apamia. Emesa.
	Chalcidice	Chalcis.
	Chalybonitis[d]	Chalybon. Thapsacus.
	Palmyrene	Palmyra.

TAB. I.—*continued.*

Greater Divisions.	Subordinate Divisions.	Chief Towns.
Cœle-Syria.	None	Damascus. Heliopolis.
Phenice. (Phenicia.)	None	Aradus. Tripolis. Berytus. Sidon. Tyrus. Ptolemais.
Palæstina.	Galilæa Superior	Cæsarea Philippi, v. Paneas.
	—— Inferior	Tiberias. Nazareth.
	Samaria	Samaria. Neapolis, (v. Sichem.) Cæsarea.
	Judæa.	
	Judæa Propria	Hierosolyma, (Jerusalem.) Jericho. Joppa.
	Pentapolis, s. Palæstina Propria	Gaza. Ashdod, v. Azotus.
	Idumæa	Hebron.
	Peræa.	
	Trachonitis	
	Gaulonitis	(The present Chaulân.)
	Batanæa	(The present Bothin.)
	Auranitis	Bostra.
	Ituræa	
	Decapolis	Gerasa. Gadara.
	Peræa propria	Pella. Amathus.
	Ammonitis	Philadelphia.
	Moabitis	

TAB. II.—*Division of Palestine (or Canaan) among the Twelve Tribes, compared with those of the Romans.*

Ancient Canaanitish Divisions.	Israelitish Divisions.	Roman Divisions.
Sidonians	Tribe of Asher (In Libanus.)	Upper Galilee.
Unknown	Naphtali (North-west of the lake of Gennesareth.)	
Pherezites	Zebulon (West of that lake.)	Lower Galilee
The same	Issachar (Valley of Esdraelon. Mount Tabor.)	
Hivites	Half-tribe of Manasseh (Dora and Cæsarea,) mingled with the following.	Samaria.
The same	Ephraim (Sichem, Samaria, district of Saronas.)	
Jebusites	Benjamin (Between Ephraim and Judah. Jericho. Jerusalem.)	Judæa.
Hittites, Amorites	Judah (Hebron. Judea proper.)	
Philistines (Pentapolis, s. Palæstina propria.)	Simeon (South-west of Judah.)	
	Dan (Joppa, &c.)	
Moabites	Reuben (Perea proper, southern part. Hesbon.)	Peræa.
Ammonites, Gilead	Gad (Northern Perea, part of Decapolis and of Ammonitis.)	
Kingdom of Bashan	Half-tribe of Manasseh (Gaulonitis, Batanea.)	

N. B. The Canaanites and Israelites having long led the lives of shepherds, their limits are not very distinct. Michaelis could not complete the researches which Reland and d'Anville began, nor can any one.

The tribes of Simeon and Dan do not appear to have ever occupied their whole territory. The Philistines lived in them in a state of vassalage. The tribe of Asher was expelled from the sea-coast by the Tyrians: Reuben, Gad, and the eastern half of Manasseh, appear never to have subjugated all the Ammonites and Moabites.

[a] Shaw's Travels.

[b] Gordon, Bibliotheque Britannique.

[c] Annales des Voyages, XIII. Mémoire sur la mer Morte. d'apres Busching.

[d] Some of the learned consider Chalybonitis as a small subdivision of Cyrrhestica. Chalybon, according to such, is the present Aleppo, Haleb, or Chalep, called also Beræa; but Ptolemy makes Beræa distinct from Chalybon.

TABLE III.—*Division of the Diocese of the East, (established by Constantine and his successors, partly also by Trajan.)*

Provinces.	Chief Towns.	Corresponding Divisions.
Arabia[a] - - - -	Bostra - - - -	Batanea. Auranitis.
Palæstina prima[b] -	Cæsarea (ad mare) *Jerusalem.	Samaria. Judæa propria. Pentapolis or the country of the Philistines.
Palæstina secunda	Scythopolis (Bethsan.) - -	Galilæa. Gaulonitis. Decapolis.
Palæstina tertia, or salutaris - - -	Petræa - - - -	Idumæa. Arabia Petræa.
Phœnicia prima -	Ptolemais *Tyrus. - - -	The Sea coast.
Phœnicia Libanica	Heliopolis? *Damascus. - -	Cœlesyria.
Syria - - - - -	Antiochia *Apamèa. - - -	Seleucia. Pieria. Cassiotis. Apamène. &c.
Syria Euphratesia	Samosata *Hierapolis. - -	Comagène. Cyrrhestica. Chalcidice.
Syria salutaris - -	Palmyra - - -	Palmyrene. Chalybonitis.
Osrhoene. Mesopotamia	See Mesopotamia.	
Cilicia prima et secunda. Cyprus. Isauria.	See Asia Minor.	

TABLE IV.—*Divisions of the Kingdom of Jerusalem in the twelfth century, according to the Abbé Guénée.*

FEUDAL DIVISIONS.

- I. Royal Domains -
  - Jerusalem.
  - Nablous.
  - Acre.
  - Tyre, and their respective districts.
- II. First Great Barony - -
  - County of Jaffa.
  - ——— of Ascalon.
  - Lordship of Rama.
  - ——— of Mirabel.
  - ——— of Ybelin.
- III. Second Great Barony - Principality of Galilee.
- IV. Third Great Barony - -
  - Lordship of Sidon.
  - ——— of Cesarea.
  - ——— of Bethsan.
- V. Fourth Great Barony - -
  - Lordship of Krak (Petra.)
  - ——— of Hebron.
  - ——— of Montreal.
- VI. County of Tripoli - - - A dependent principality, but distinct from the kingdom of Jerusalem.

a The coins found by Mr. Seetzen at Gerasa and other places belong to the reign of the Antonines. It is probable that the division under the name of Arabia is as old as Trajan or the Antonines.

ECCLESIASTICAL DIVISIONS.

- I. Patriarchate of Jerusalem
  - Bishopric of Bethlehem.
  - ——— of Lydda.
  - ——— of Hebron.
- II. Archbishopric of Krak - ——— of Mount Sinai.
- III. Ditto of Cæsarea - - - ——— of Sebaste. (Samaria.)
- IV. Ditto of Nazareth - - -
  - ——— of Tiberias.
  - Priory of Mount Tabor.
- V. Ditto of Tyre - - - -
  - Bishopric of Berytus.
  - ——— of Sidon.
  - ——— of Paneas.
  - ——— of Ptolemais.

TABLE V.—*Present leading divisions of Syria*

Divisions.	Towns.	Corresponding Divisions of Antiquity.
Pashâlic of Aleppo.	Aleppo. Aintab. Bir. Mambedj. Antakia. Skanderoon.	Comagene. Cyrrhestica. Chalcidice. Seleucia. Antiochène (in Upper Syria.)
Pashâlic of Tripoli.	Tarabolos, (Tripoli.) Latakia. Djebil.	Casiotis, (of Upper Syria.) The north part of Phœnicia.
Pashâlic of Seide, (or of Acre.)	Seide. Acre. Dair-el-Kamar (in the country of the Druses.) Saphet.	Phœnicia. Cœlesyria, in its most limited acceptation. Galilee.
Pashâlic of Damascus.	Famieh, (Apamea.) Tadmor, (Palmyra.) Damascus. Jerusalem. Gaza	Apamene and Palmyrene, (of Upper Syria.) Eastern Cœlesyria. Palestine, with the exception of Galilee.

Present Divisions of Ancient Palestine, according to Busching, Volney, and others.

I. El-Kods - - -	Jerusalem. Jericho, &c. The north-west of Judea.
II. El-Khalil - - -	Hebron, and the south of Judea.
III. Gaza or Palestine	The sea coast, with Jaffa, Gaza, &c.
IV. Ludd - - - -	A district round the city of Ludd.
V. Nablous - - -	The city of this name, with the ancient country of Samaria.
VI. Areta - - - -	Mount Carmel, with part of the plain of Esdraelon.
VII. Saphet - - -	Ancient Galilee, called also Belad-el-Bushra, or the country of the Gospel.
VIII. Belad Shekyf	Ancient Trachonitis, with Belad-Hauran, Auranitis, &c.
IX. El-Gaur, (eastern.)	Ancient Peræa. One district is named Es-Szalth.
X. El-Sharrat - -	On the south and south-east of the Dead Sea, with El-Djebal, the ancient Gébalene.

b Finding Cesarea preferred to Jerusalem as the capital, we are led to believe that these divisions of Palestine are as old as the reign of Adrian, if not of Titus.

BOOK XXIX.

TURKEY IN ASIA.

PART IV.

A general view of the Ottoman Empire.

HAVING described the provinces of Asiatic Turkey with that care which is justly claimed by countries which once enjoyed so brilliant a celebrity, and which, let us hope, will, at some future time, be again subjected to the benign influence of civilization, let us now take a political survey of the Turkish empire, which also extends into Europe and into Africa, though its principal possessions are in Asia.

The darkness in which the history of the Turkish or Tartar nations in general is enveloped, conceals from our view the origin of that tribe which has acquired such celebrity under the name of the Othmans.[a] We have already seen that certain Turks, governed by princes of the Seldjoukid race, were, in the tenth, eleventh, and twelfth centuries, in possession of a powerful state, which, under the name of the Sultanat of Konieh, or of Room, comprehended Asia Minor, with Armenia and Georgia. About the year 1308 this sultanat was destroyed by the Mongols; and in a short time the Ottoman power appeared in its stead. The learned Deguignes thought he had proved[b] that the Ottomans were a Cumanian tribe which was driven from Chorassem by these same Mongols, and came to settle in the mountains of Taurus, under the protection of the sultans of Room, about the year 1231. Whatever may have been their previous history, one of the chiefs of this tribe, named Othman, made himself independent about the year 1300; and his successors, adopting the title of "sultan," in exchange for that of "emir," contrived in the course of a century to extend their empire from the banks of the Euphrates to those of the Danube. Thrace, Servia, Macedonia, and Thessaly, were already subject to their power, and Constantinople was surrounded by their conquests; when Tamerlane, in 1402, having defeated the sultan Bajazet the first, the Ottoman power seemed to totter. Constantinople began to breathe from the pressure by which her existence had been threatened; but Mahomet the first, with the assistance of the vizir Ibrahim Khan, re-established the fortunes of the Turks. The great Amurat the second, maintained a desperate contest with Joannes Hunniades and Scanderberg, antagonists every way worthy of him. He punished the perfidy of the Christians by the defeat of their main army at Varna. Mahomet the second, in 1453, entered Constantinople sword in hand, and established himself on the throne of Constantine and Justinian. From Trebisond to Bosnia every thing submitted without a contest to his arms. He subdued the Crimea; his fleets made descents even on Italy. Selim I. in 1517, overthrowing the sultanat of the Mamelukes, subjugated Syria and Egypt. Rhodes was wrested from its valorous knights. Hungary, distracted by intestine broils, opened in 1520 a passage for Soliman II. to Vienna: but this imperial city presented an effectual barrier to the further progress of the Crescent. However, Selim II. wrested from the Venetians the isle of Cyprus; and the defeat of the Turkish fleet near Lepanto in 1571, was not followed by any important consequences. But a race of weak sultans, and a series of revolutions in the seraglio, now sowed in the empire the seeds of anarchy. Under Mahomet IV. the energy of the nation seemed to revive: the island of Candia was conquered. Vienna sustained a second siege in 1683, which was raised by the exertions of John Sobieski, king of Poland. The conquest of Bagdat marked the superiority of the Turkish to the Persian power. But no Solimans nor Amurats now sat on the throne of Constantinople. A century was spent in frequent wars, attended by no decisive results. Asoph, in the north, conquered in 1642, was lost and reconquered. The Morea, lost in 1699, was soon after subjected to the Turkish power. Austria, which in 1699 and 1718 had made large acquisitions in Servia and Wallachia, lost her advantages in the disgraceful treaty of 1739, by which the Russians themselves were forced to surrender the conquests which they had made under the conduct of Munnich. Yet this war instructed Europe in the secret of the weakness of the Ottomans. Russia soon ventured to contend single-handed with the Turks, and beat them by land and by sea. Romanzoff passed the Danube: the fleet of Orloff sailed round from the north into the Mediterranean, and burned the Turkish fleet in the Bay of Tchesme. The treaty of 1774 restored independence to the Crimea and Kuban, delivered up to the Russians the most important military stations in those countries, and thus opened to their flag the Black Sea and the passage of the Dardanelles The Ottoman Porte attempted to evade these severe conditions. In consequence of this reluctance, she saw Crimea in the possession of the Russians in 1783; and, in five years after, was involved in a war with Russia and Austria together. It was to the inexperience of Joseph II. and of Prince Potemkin, to the

[a] Pronounced in Arabic *Oshman.*

[b] Histoire des Huns &c. tom. IV. p. 350.

daring efforts of Gustavus III. in the north, and to the interference of the Prussian and British governments, that she was indebted for the conclusion of the war, in which Otchakoff was lost, and which threatened the instant expulsion of the Turks from Europe. Russia, however, afterwards availed herself of the events of the French Revolution to engage the Turks in an alliance, by which her command over the destinies of that empire was extended to every corner. A weak divan sacrificed its independence for the recovery of Egypt. The Russian squadrons passed under the sacred walls of the seraglio. The Russian armies established themselves in the Grecian islands; the name of Russia was invoked by the restless spirits of Servia and Wallachia, eager to throw off the yoke of Turkey. The French under Bonaparte, pleasing themselves with the prospect of universal conquest, spared the Turkish power only because the conquest of the Russian empire was a more brilliant object for their arms, and the materials of that empire were more easily amalgamated with those already in the hands of this all-powerful invader, and more easily made effective for future conquests. The sudden fall of French preponderance having imparted a renovated energy to the influence of the Russian monarchy, and Austria being for the moment in mutual league with Russia, the extinction of Turkish domination now becomes a matter of the utmost facility. Great Britain may wish to interpose her power to check the extension of an empire so threatening in its aspect towards herself as Russia. But the Russian power is too close on Turkey, and has in other respects too little to dread from any other nation, to allow such distant considerations to shackle her movements. Or, if she wishes to avoid a contest with the maritime prowess of that country, she may purchase her peace by a division of the spoil, allowing to the British, what she cannot prevent, the occupation of the numerous islands of the Mediterranean, now in the hands of the Turks. Such is the morality dictated by the sword, the law of emperors and domineering courts, the execution of which may be postponed by convenience or a sense of decency, while the occurrence of future pretexts and opportunities is wished for and expected. It is well for mankind when this looseness of international principle is in some degree expiated by the establishment of just institutions, and the protection of civil liberty in the countries subjected to these mutually tolerated and occasionally confederated powers. We have not yet reached the period when a plurality of them have shown any willingness to adjust their relative interests by a conjoint relinquishment of conquests which they have long held, in favour of home-born governments, suited to the original character and the cherished pride of ancient national communities. But, taking men as they are, and considering the ready intercourse now maintained among the most distant parts of our planet, it becomes matter of doubt whether extensive governments are not better suited to the repose of the world, than a frittering down of the inhabited earth into small nations, where the prejudices and the inclinations of one ferocious tribe might disturb the transactions of all who come in contact with them. The ravages attending the wars of great nations are, while they last, evils of proportional magnitude. But they are open; they attract attention; they give warning to the peaceful to prepare for avoiding the scene, or to choose the part which their inclination or principles may lead them to take in the contest: and, when these are terminated, they leave mankind in a condition to prosecute the business of life without the perpetual dread of lawless attacks. We have not yet arrived at an era in which the bubble of military glory has lost its delusive hues, nor is civilization so widely extended as to produce one deliberate understanding, and one code of mutual conduct among the whole human species. It is when local prejudices and confined habits are prohibited from exercising an influence on more foreign relations, that the great mass of mankind will have it in their power to lay a hand of gentleness, but of irresistible weight, on every unjust inclination, and to repress in the conduct of conspicuous individuals every movement implying a tendency to a vain and ungenerous aggrandizement. Were this happily the case, the rare occurrence of international crimes would limit the field of pretexts for acts of unjust aggression under the guise of a redress of our own or other's grievances, or a forcible maintenance of the peace of the world.

While we wait for the effects of political circumstances, we perceive in every quarter of the Turkish frontier the encroachments of adverse fortune. An extremely precarious authority is all that is left to the Porte in Africa. The uncertain boundaries of Syria are liable to the constant insults of the Arabs. The line of separation from the Persian empire has continued unaltered for a century, but the pasha of Bagdat and the tribes of Koordistan yield to the Grand Sultan a very dubious homage. It is not easy to say where the Turks have a barrier on the side of Russia. The latter extends to the banks of the Phasis in Asia, and to those of the Danube in Europe. On the side of Austria, the mountains of Transylvania and part of the course of the Danube and the Save, form a sort of natural frontier, rendered ineffectual by Dalmatia (which spreads over the frontiers of Servia and Bosnia) having passed through the hands of Bonaparte into those of Austria, and the Ionian Islands having passed through the same medium into the hands of Britain.

A government of a mild and enlightened character, possessed of these extensive countries, might form one of the finest empires in the world. It would derive great commercial advantages from that central situation which Turkey enjoys in the old continent, giving her so ready access to the commodities of Europe, Asia, and Africa; that intercourse being at the same time admirably facilitated by the openings which the Mediterranean Sea, the Red Sea, the Persian Gulf, and the river Euphrates, afford to the two great oceans of the globe.

The Turks never reckon up their population, nor keep statistical records of the component parts of their empire. They do not know whether it is so much depopulated as others represent it, or if their weakness in this particular has been exaggerated. With respect to extent of territory, the results of a comparative examination of modern accounts and modern maps are represented in the following Table:

TURKEY IN EUROPE.

	Square Miles.	Square Myriam.
Moldavia (with Bessarabia)[a]	26,639	693
Wallachia	23,066	574
Servia, Bosnia, and Turkish Dalmatia	31,366	816
Bulgaria	27,174	707
Romania proper	25,716	669
Macedonia	21,142	550
Albania proper	16,645	433
Epirus, Thessaly, Livadia	14,915	388
Morea	7,227	188
Candia or Crete	4,613	120
Eubea and the other European isles	3,806	99
Total Turkey in Europe	202,309[b]	5,237

TURKEY IN ASIA.

Anatolia, with Caramania and Room, as far as the Euphrates	200,196	5,208
Syria, exclusive of the Desert	51,778	1,347
Armenia, with Turkish Georgia, &c.	64,002	1,665
Diarbekir, Mesopotamia, &c.	144,650	3,763
Total, Turkey in Asia	460,626	11,983
Do. Do. in Europe	202,309	5,237
Egypt	152,261	3,961
Total of the Ottoman Empire, exclusive of the Barbary States)	815,196[c]	21,181

It would be vain to expect a near approximation to the truth, in any conjectures which we might indulge respecting the population of a state in which registers and a regular census are unknown. Some writers estimate that of European Turkey at twenty-two, while others have reduced it to eight millions,[d] and both assign equally plausible grounds for their opinions. Respecting Asiatic Turkey, the uncertainty, if not still greater, is at least more generally acknowledged. Supposing the houses to be as thinly scattered as in the less populous parts of Spain, the population of all Turkey, in Europe, Asia, and Africa, may amount to 25 or 30 millions, of which one half belongs to Asia. Under the want of any thing like positive evidence, we shall not deviate far from probability in allowing to Anatolia, five millions; to Armenia, two;[e] to Koordistan, one; to the pashâlics of Bagdat, Mosul, and Diarbekir, one and a half; and to Syria, 1,800,000, or at most two millions.

The moral and political condition of the Ottomans is a subject which presents less uncertainty, and is in itself more interesting. The Turks are allowed to be a large, well formed, and robust race of men, of a harsh yet often a noble physiognomy, and a slightly tawny complexion, with black or rather dark brown hair.[f] They have a natural gravity of deportment, which is increased by a large flowing dress, thick rolls of turban on the head, and long mustaches, the last of which ornaments are by them, as by all Asiatic nations, reckoned indispensible.[g] Their exterior gives no countenance to the Mongol extraction which their national authors ascribe to them. They seem to differ from other Tartar nations in nothing else than a degree of favourable alteration arising from an admixture of European blood. The language of the Turks, in the unanimous opinion of philologists, has in its radical materials a closer alliance with that of the Tartars than with any other.[h] But the Turkish writers have introduced into their more elevated style many words and phrases adopted from the copious language of Arabia, or from the elegant idiom of modern Persia. This admixture has procured to the Turkish language the appellation of *Mulemma*, or "the pied mare."[i] The Turks being, of all the races which have proceeded from central Asia, that which has most recently settled in Europe, and their former glory and honour having inspired them with a lofty national pride, we find them still preserving inviolable, and most particularly in the Asiatic provinces, the same religious creed, and the same manners and customs by which three centuries ago they were distinguished, a constancy which might merit our praise if enlightened and directed by sound principles of policy. Frugal, and generally vegetable fare, a prevalent abstinence from wine, habitual masculine exercises, such as riding and the use of arms, (the more effeminate exercise of dancing being proscribed,) a grave ceremonious hospitality, taciturnity, much external devotion, simple and quiet dwellings, gardens retired and romantic, these are the chief features which impart to the mode of living of the Turks, as well as the orientals in general, an original and distinct character.

The indolent Turk is a stranger to the bustle of our social circles; he reposes on his sopha covered with the softest cushions; smokes the tobacco of Syria; warms and regales himself by sipping at short intervals the coffee of Moka; looks on while his slaves dance before him; and at times takes a few grains of opium, by which his imagination is transported to the third heavens. Polygamy, however, is far from bringing to every Mussulman that exuberance of voluptuous enjoyment with which, in the minds of the inexperienced and unreflecting, the word is so often associated. The Turkish women being entitled to spend with extravagance, while they have no line of industry to follow, men of moderate fortune are prudent enough to confine themselves to one wife. Sometimes those women who are at their own disposal, or their relations for them, insist, in their marriage contracts, on a formal renunciation on the part of the husband of the license which Mahometans enjoy to marry four wives. Polygamy thus becomes the luxury of the rich and the great. Female slaves, purchased from the Georgians and Circassians, but in larger proportions from the Lesghians, people their harams, those close and sacred apartments within which Turkish jealousy has confined the empire of beauty. When walking abroad from their harams, which we improperly call seraglios,[k] the Mahometan women, whether wives or concubines, are always cover-

[a] Bessarabia and that part of Moldavia, to the E. and N. of the Pruth, were ceded to Russia by the treaty of Bucharest, (1812.) The present extent of Turkish Moldavia is only 17,000 square miles.—P.

[b] "26,440 square French leagues, 25 to a degree of the Equator."

[c] "106,940 square French leagues."

[d] Bruns. Magas. Géograph. I. cah. 1. p. 68—74. compared with Ludecke's Authentic Account of the Ottoman Empire. Eton's View and de Tott's Memoirs.

[e] Olivier, Voyage, IV. Volney, Voyage en Syrie, II.

[f] Busbeck, Ludecke, Lady M. Montague, &c.

[g] Tott, I. 191.

[h] The Turkish language is a branch of the great Tartar family of languages, and is placed by Adelung in his first division or Southern Tartars. Its original seat was in Independent Tartary, where the languages now spoken by many of the nomadic tribes, may be understood by one familiar with the dialect of Constantinople. *J. Klaproth.*—P.

[i] Adelung, Mithrid. I. 459, &c. Jenisch, de fatis linguarum orientalium. Meninski, Dictionarium Turcicum, &c.

[k] Seraglio [serai] is a Persian word for a palace.

ed with triple veils, and a dress by which the features and the forms of these walking mummies are effectually concealed from the most sagacious observation. It is only in their baths, which are scrupulously locked, or in the interior of their harams, that the women enjoy one another's society, and give entertainments. There they regale themselves with sherbet, sweetmeats, coffee, and tobacco: there they display their dresses, their laces, their jewels, and indulge in criticisms on their husbands or their neighbours. Dancing girls are admitted, who entertain them with rather wanton exhibitions; but no women of character dance in Turkey. The Turkish women are not furnished with any pretext for occasional liberty by the places of worship, the law of Mahomet not requiring them to attend prayers in public. But notwithstanding the precautions employed, we are told that the Mahometan ladies find some opportunities of repaying the indifference or the infidelity of a husband; that by the medium of the milliners, who are generally Jews or Armenians, they can extend their correspondence beyond the triple walls of the haram of the most formidable pashâ. It is said, but we do not vouch for the accuracy of the fact, that as they cannot read or write *billet doux*, they convey their sentiments by showing or sending flowers under certain emblematic arrangements.[a]

The Turks have some points which indicate the gentle feelings of humanity lurking in the heart. The same species of benevolence which restrains the Indians from depriving animals of life, seems to be equally inherent in the masters of the Bosphorus. In the Turkish towns dogs and cats enjoy an abundance which our beggars might envy. Flocks of pigeons traversing the air, light on the merchant vessels which are loaded with grain, to levy a tribute, which is seldom refused them. Aquatic birds swarm on the banks of the canal at Constantinople, and their nests are respected even by children. This benevolence is even extended to trees. A useful and commendable prejudice prevents the most avaricious proprietor from depriving the village or the field of their pleasing and salubrious shade. The rich take a pride in adorning the public walks with fountains and with seats, two things which are rendered necessary by the frequent ablutions and prayers enjoined by the Mahometan religion. The khans, or caravanseras, are public inns, in which travellers and working people are lodged without payment. In the houses of the Turkish proprietors, whether in the Morea, Anatolia, or the island of Candia, several travellers concur in remarking purity of manners, domestic happiness, and a patriarchal hospitality.[b] But the extreme pride of the Turks, rendered more offensive by the harshness of their manners, has so wounded the feelings of the generality of travellers, that they have seen nothing in the whole race except a ferocity, an ignorance, and a grossness, which are proof against all the means of civilization. Europe has forgotten the power and the able policy of the Amurats and the Solimans. To scandalous terrors, and a stupor blended with admiration, an extreme and groundless contempt has succeeded. We are too apt to lose sight of the influence of laws and institutions in moulding the character of a people.

It is not to despotism, in the meaning annexed to that word by modern Europeans, that the misery and weakness of Turkey must be ascribed. The Sultan, who also assumes the title of Padi-Shah, translated the Grand Signor, is far from enjoying by law an unlimited authority. He cannot infringe on any of the rules dictated in the Koran, the divine law which is obligatory on all the Moslem or true believers. He cannot even, without extreme risk, interfere with the institutions which long usage and national prejudice have consecrated. He appoints and displaces at his pleasure the great civil and military functionaries; he is master of their fortune and their lives. But the exercise of this formidable power is impeded by great obstacles. One pashâ beats the armies sent to deprive him of his government; another sends to Constantinople the head of the capidji who came for his. Yet these restrictions on the sultan's power, substantial as they are, have not the effect which some have maintained, of making Turkey[c] a limited monarchy in the European acceptation. We rather find in the constitution of that empire a military tyranny which has fallen to pieces, and degenerated into anarchy. The rules of the Koran are very vague, and the opposition made by the people and by the pashâs amounts to nothing more than a dismal train of devastating insurrections. Its political state is characterized by two principles. The first is, that every man who is invested with power, is at liberty to delegate this power entirely to another: the sultan is the vicegerent of the prophet; every pashâ is a representative of the sultan; every soldier who carries an order is the representative of the pashâ.[d] This principle, which by multiplying to infinity the number of oppressors, makes the oppression bear heavily on all classes, is the consequence of the military origin of the Turkish empire. This victorious nation continues to treat its vast conquests like a city taken by assault. It is less like a nation than an army encamped in the midst of vanquished nations. Hence a second fundamental principle, that all persons and property conquered by the Ottomans belong to the Sultan. What can Christians, Jews, Armenians, and other dogs, be accounted, but the slaves of the conqueror? They are allowed to live, but are forced to pay a tribute, the receipt for which bears that it is the ransom of their heads. The same principle applied to territory, prevents the Turks themselves from having a right in fee simple to any heritable property. They are only tenants for life; and when they die without male issue, the sultan becomes their heir. If there are sons, he claims indeed only a tenth of the property left; but the clerks of the treasury employed to value this tenth, rate it as high as they please.[e] The state officers do not even enjoy this imperfect right; whatever they possess falls at their death into the hands of the sultan. This instability of

[a] Lady M. Montague's Letters. Hammer in the "Fundgruben des Orients, No. 1." or the "Annales des Voyages."

[b] Savary's Letters on Greece. Schulze, in Paulus, VII. Chandler's Travels in Asia Minor, passim.

[c] Porter on the Religion, Laws, &c. of the Turks, chiefly in chap. VI. p. 75—78. 2d edition, London, 1771.

[d] Volney, Syrie, II., du Gouvernement des Turcs.

[e] Ludecke, Relation de Turquie, 1. § 63.

property prevents any one from undertaking expensive and substantial buildings.[a] The Turks prefer the collecting of trinkets and such riches as are portable and easily concealed. The only way of avoiding this system of universal confiscation is, according to the acknowledgment of one of the vindicators of the Turks, to give their lands as a *vakf*, that is, a pious legacy, to a mosque; the proprietor, on paying a small rent to the mosque, thus becomes an irremoveable tenant;[b] but the lawyers, whose employment it is to take the charge of these legacies, often contrive to become the chief profiters by this singular institution. We must add to the two principles now stated, the universal prevalence of a most scandalous venality. The situations of pashâ, of cadi or judge, and all public employments, are openly given to the highest offerer. He naturally uses his best exertions during his term of office, generally short, to indemnify himself at the expense of those whom he governs. The anarchy is increased by the obscurity and ambiguity of the laws. This vast empire is in want of a legal code more precise and more suited to the existing state of things than that of Soliman II., which consists of the substance of the institutes of Justinian and Theodosius, enforced by the moral precepts of the Koran. Probably in this, as in other countries, the professional persons whose business it is to execute the forms which the law enjoins, and who are generally unwilling to acquire new habits in their business, would raise a clamour against all material improvement. Turkey is also in want of institutions capable of restraining the arbitrary power of men in place, and of securing the execution of the laws from personal influence.

The general weakness of monarchs born in the seraglio has led them to entrust the cares of government to a prime minster, called the vésir-azem, or grand vizier. This personage is, in the full extent of the term, the vicegerent of the sultan. He keeps the imperial seal, he commands the armies in person, he arranges the finances of the state, he disposes of all civil and military offices. But the responsibility attached to his situation is dreadful in proportion to his power. To him are attributed all the misfortunes that befal the state, scarcities, conflagrations, military defeats, rebellions, and epidemic diseases. The sword, constantly suspended over his head, strikes him with equal certainty whether he displeases the people or the sultan. Encompassed with snares, and laid open to every person's attacks, it is rarely that in this high situation he reaches old age.

The divan or council of state consists of the principal ministers. The Reis Effendi is the High Chancellor of the empire, and stands at the head of the body of kodja or attorneys, which has contrived to acquire a great political influence, and which at the present moment contains the best informed men of the nation.

The Uléma, or the body of doctors in theology and jurisprudence, is entrusted with the guardianship of the fundamental laws of the empire. These laws are reducible to the Koran itself, and the commentaries which the ancient doctors have written on it. The members of the Uléma, who are called Effendi, combine the judicial with the religious autnority. They are both the interpreters of religion, and the judges in all civil and criminal causes. None of them can be legally condemned to death without the consent of their head.[c]

The mufti, or sheik-al-islam, is the supreme head of the Uléma, and the vicegerent of the sultan, as caliph, or successor of Mahomet, and head of the church. The sultan issues no law, makes no declaration of war, establishes no tax, without having obtained a fetsa or decision of the mufti. This high office would form a sort of counterpoise to the almost unlimited authority of the sovereign, and might even paralyse its exertions, did not the sultans take on themselves the power of deposing, banishing, or even decapitating the mufti. The mufti presents annually to the sultan a list of candidates for the highest judicial situations; they are from the body of the Uléma. The influence both of the mufti and of the Uléma would be far greater than it is, if they could maintain a good character for probity. But the venality of all employments introduces into all ranks and conditions of the inhabitants of this empire such cupidity and corruption, that the least favour or service conferred must be purchased by presents. The sentence of the judge, and the declarations of witnesses, are purchased in the same way as any employment or any favour from a man in place is purchased. In no country in the world are false witnesses so common and so devoid of shame as in Turkey. This is productive of a state of society so much the more dreadful, as all gradations of judges, the molla, the cadi, and the simple naïb, pronounce a sentence from which there lies no appeal. The Turkish jurisprudence is that of a tribe of wandering soldiers. After a few depositions on oath on each side of the question, the cadi pronounces his sentence, supported by some passage from the Koran. To order the bastinado as the punishment of the common people's minor offences, to impose a fine, or what is called in the Levant an avanie, on a rich Greek or European, to condemn a thief to be hanged, constitute all the duties and all the knowledge of an ordinary judge. Without information, and without intelligent pleaders, justice is awarded, or injustice consummated, in a few hours. This is exactly what we must suppose to have been the method of proceeding in the camp of Othman. Hence the two great judges, that of Roumili or Europe, and that of Anadhouli or Asia, are denominated kadi-laskar,[d] or "military judges."[e]

Yet the Ottoman empire is not without a species of popular representation. The chief delegates of the people are called ayams, from an Arabic word for "the eye;" their office consists in watching over the safety and interests of private individuals, in attending to the good order and the defence of the towns and cities, in resisting the unjust proceedings of the pashâs, and the exactions of the military, and in looking after the equitable distribution of the taxes. These are usually men of the most virtuous characters, who, when chosen by the people, discharge this honourable function without remuneration. The ayams summon to their council the leading men of the place, and the practitioners of the

[a] Lady M. W. Mont. vol. II. Letter 32.
[b] Porter, p. 79—80.
[c] Muradjee d'Ohsson, Description of the Ottoman Empire.
[d] Fr. "*cadi-lesquier.*
[e] Tournefort, Voyage du Levant, II. Lett. 14. Volney, II. l. c

law, to discuss the general interests, to put in due form such representations as are to be made to the pashâ, and to make out, in concert, any subjects of complaint against him which it may be necessary to present to the Porte. Almost every Mussulman, from the merchant to the lowest mechanic, belongs to some corporation, the heads of which are commissioned to watch over the rights of the community and of individuals. If the lowest member is arraigned before a *mékémé*, or court of justice, the heads of the body to which he belongs appear in his defence. Sometimes the whole body is known to intercede in favour of a person known to be innocent. Yet justice is for the most part only to be obtained by the payment of a sum of money.

The provincial administration is modelled on the same system by which the empire is governed. The pashâs, distinguished in rank by the number of tails or standards which they use, unite the military to the civil power, and, by an abuse still more prejudicial to the interests of the people, the greater part unite with these the farming of the taxes. They would be completely sultâns on a smaller scale, were not the judicial power entirely in the hands of the cadis. The pashâ with three tails possesses, like the sultan whom he represents, the dreadful prerogative of punishing with death any agent whom he employs, and even any individual who seems to threaten the general safety.[a] Some pashâs of three tails have the title of beglerbeg, as the pashâ of Sophia or Romelia, and the pashâ of Kutaïeh or Anatolia. The pashâ keeps on foot a military establishment, more or less numerous according to the condition of his revenues and the position of his pashâlic, and marches at the head of his armed force when the frontier is menaced, or when he is called on by his sovereign. The beys and the sanjaks, or sub-governors, are under his orders. This accumulation of powers often renders the provinces a prey to tyranny. In the capital, many things concur to restrain the spirit of oppression; the presence of the sovereign, a greater collection of well informed persons, an immense population, and the expectation of credit, of favour, and of power. The Grand Vizier watches over his ministers, and is watched by them in his turn. Even the Sultan has usually a secret police in pay. In short, the people, when they choose to rebel against their tyrants, by setting the city on fire, almost always find support in the jealousy or ambition, if not in the indignant probity of some powerful individual; but the provinces have no such resources to put in action against their pashâs. If, in the end, the numbers of complaints and insurrections demonstrate the insupportable oppression under which a province groans, the government sends a capidji with a secret order for his execution, or another pashâ with an army; the guilty pashâ is seized; his bloody head is exhibited on the gate of the seraglio; his wealth goes into the coffers of the state, and thus the people are revenged: exactly such another scene as the Roman Empire exhibited with its proconsuls and its prætors, whose heads a centurion was very commonly ordered to bring and present at the foot of the throne, after they had for a sufficient time pillaged Gaul, Syria, or Africa.

One of the greatest misfortunes of the Ottoman empire is the diversity of its religions, with their reciprocal spirit of hostility. The Turks and other Mahometans do not form a third part of the population of European Turkey, and not more than two-fifths of that of Turkey in Asia. Three-fifths, perhaps two-thirds, of the whole population, consist of nations which profess Christianity. Besides the Greeks, properly so called, there are Sclavonian tribes, such as the Servians, Wallachians, and Montenegrins, which follow the ritual of the eastern Greek church. This church, which the Roman Catholics consider as schismatical, persecutes with savage fury the inconsiderable number of united Greeks, as they are called, or those who acknowledge the authority of the Pope. The Armenians form a numerous church, which derives a great influence from its character for austerity and for probity. Other religious communities, such as that of the Jacobites called Copts in Egypt, the Nestorians and the Maronites, derive a degree of strength from the internal union which they respectively enjoy. The Druses are the avowed enemies of the system of Mahomet. The Jews swarm in Turkey more than in any country of Europe. All these associations are, in the eyes of the Turks, so many bands of conspirators. All, excepting the Maronites and the Druses, are restricted in the free exercise of their worship, subjected to marks of ignominy, and abandoned to injustice, without protection or defence: and all are actuated by a spirit of inveterate hatred to one another, and thus deprived even of that sad harmony which a participation in slavery might engender. Had the Turks conjoined a longer-sighted policy with their religious predilections, they might have exterminated, either by brutal force, or by a system of discouragement to an infidel in favour of a Mahometan population, every race that was guided by an obnoxious faith. While from some quarters of Europe we contemplate the medley of religions that subsists in Turkey, shall we rejoice in the effect, while we despise the infatuation that tolerates and produces it, or shall we recognize in this fact a degree of laudable tolerance, to the renunciation of which some countries of Christendom owe at least a temporary, if not a perpetual state of comparative repose? The total extirpation of the Mahometans from Spain, the determined and unrelenting extinction of the first efforts of the Lutheran reformation in that country and in Italy, and the rigid policy which the governments of these countries still maintain on the topic of religion, present a contrast to the practice in Turkey which the liberal and candid will not be forward to applaud.

The absurdities of the religion of Mahomet have undoubtedly been sometimes exaggerated. Its radical doctrines are certainly simple, and, even allowing that its precepts were unexceptionable, the pretensions of its origin are as unnecessary for any moral purpose as they are in themselves extravagant and overbearing. The very simplicity of its doctrines has excluded the spirit of inquiry and improvement. It has remained, as at its earliest appearance, a religion only adapted to a horde of conquerors. The exclusive attachment of its followers to the Koran, a book replete with raving follies, interspersed with a few poetical effusions; the inflexible fanaticism with which it inflames the mind, and the contempt which it inculcates for all profane knowledge,

[a] Ludecke, I. § 60.

fetter the communications of its votaries with other people, and thus raise an insurmountable barrier against arts and sciences of every kind.

The influence of this religion modifies in some measure the physical constitution of the Mussulmans, the prohibition of wine having generated among some a secret abuse of spirituous liquors, and among others a pernicious indulgence in opium. The injunction of frequent ablutions induces rich individuals to build many public fountains; these maintain habits of cleanliness which are conducive to health. The Turkish burying grounds are pleasing in the eyes of the religious. The flowers which they carefully cultivate on the surfaces of their graves, the cypresses with which they shadow them, and the resort of families to these places to mourn over the memory of deceased friends, form a mixture of sorrow, devotion, and pleasing rural scenery, which gives an agreeable surprise to every traveller of sensibility.[a] The lents of the Mussulmans, which occupy at least seven months of the year, are rigidly observed. No necessity, however pressing, will induce them to dispense with the fulfilment of their rules. The fast of the Ramadan, which lasts for a month, precedes the Bairam, a festival equally solemn in Turkey as that of Easter is among the Roman Catholic Christians.

The Dervises are monks who are addicted to acts of religion of an extravagant description, principally consisting in a convulsive species of dancing. The Imauns, or officiating priests of the Turkish mosques,[b] enjoy no such credit and power as the body of the Uléma already described.

Such being the genius of the Mahometan religion, it is no surprise to find that the civilization of the Turks, in so far as literature and science are concerned, is still in its infancy. Yet they have in some measure felt the necessity of public instruction. To the imperial mosques of Constantinople, of Broosa and Adrianople, *madresses* or colleges are attached, to which the youth are sent from all parts of the empire, to receive instruction in the law of the prophet, in religious, civil, and criminal jurisprudence, and to acquire erudition in all the strange opinions and extravagant subtilties of the expounders of the Koran. They are subjected to various examinations, and, when they have made the due proficiency, receive the degree of *muderis*, or professors. These colleges were founded by different sultâns: the first at Nicæa, in 1330, by Orkhan; but that of the mosque of Soliman at Constantinople is the most esteemed. They have a considerable revenue, and support two or three thousand scholars. The pupils afterwards fill all the civil and judicial situations. But in Turkey, as in other countries, knowledge when limited to a few often merely serves to render tyranny more expert. In that country there is no channel for a general communication of thought. The Mussulmans certainly owe to their kodjahs, or writers, many works highly esteemed among them, on the Arabic and Persian languages, on philosophy, morality, the Mahometan history, and the geography of their provinces. These works, written generally in a bombastic style, may contain some knowledge, but they are not circulated among the great mass of the nation. The attempts made to introduce printing have encountered the powerful opposition of all the tribe of writers, as threatening to deprive copyists of their means of living, and consequently this art has never yet been able to acquire a permanent footing in Turkey. It is at least partly from that cause that this country is so far behind Christian Europe in civilization. Of late, however, this noble art has received the patronage of the Grand Signor, and several regular printing establishments have been formed.[c]

The absence of scientific knowledge necessarily affects the state of the useful arts. Although the Turks, especially those of Asia, are not destitute of a taste for agriculture, this first of arts is in a languishing condition in all parts of the Ottoman empire. Those fields are indifferently cultivated which are liable to be reaped by a rapacious pashâ, or by a body of marauders. Manufacturing industry maintains its ground in some cities, among which the most conspicuous are Damascus, Aleppo, Mosul, Angora, Kastamooni, Broosa, and Smyrna, in Asia; and in Europe, Constantinople, Salonica, Adrianople, and Rustshuk. The chief manufactured produce consists of carpets, moroccos, silks, Turkey thread, and sabres. Commerce is chiefly kept up by the exportation of raw materials, such as wool, silk, cotton, hides, tobacco, and metals, particularly copper. Wines, oils, figs, dates, almonds, currants, and other fruits, furnish leading articles of export. We also receive from that country madder, gall-nuts, alum, pipe-clay, bole, and meerschaum.

The Mussulmans are little addicted to commerce, but some of them are able agriculturists; and they show considerable dexterity as cloth manufacturers, tanners, and armourers. Their works in steel and in copper, as well as their dyed stuffs, equal or excel the most perfect productions of Europe in the same departments.[d] They have also tailors and shoemakers more intelligent than ours. The Greeks, forming so numerous a body, are of course engaged in all the arts and professions. Among them are found the best seamen of the Ottoman empire; but their nautical skill makes a poor figure in the eyes of other Europeans,[e] with the exception of some of the islanders of the Archipelago. The Armenians are the most industrious mercantile people in the empire. Patient, economical, and indefatigable, they traverse the interior of Asia, as far as India. In every place they have their correspondents and their stores. The greater part of them exercise mechanical arts: they at the same time act as bankers, brokers, and men of business to pashâs and other persons of distinction. The Jews here appear in a more unfavourable light than in the west of Europe. They follow every sort of trade that promises to be profitable.

[a] Chateaubriand, Itineraire, I. 36. Castellan, Lettres sur la Greece, partie II. lettre 20.

[b] *Mesgcd.*

[c] In the Revue Encyclopedique for May, 1821, there is a review of a Turkish publication on Anatomy, Medicine, and Therapeutics, by Chanizadeh, a member of the Ulema, partly taken from the French, German, and English authors, in one folio volume, with fifty-six copper-plates, printed at Constantinople in 1820. This is the first scientific work that has appeared. It was written and published by order of the Turkish government, or rather in virtue of a Khatti-sheriff, or edict of the Grand Signor, who could only give it in his quality of Caliph, or supreme head of the church.

[d] Sestini's Travels in Asiatic Turkey, letter 25.

[e] Pouqueville's Travels in the Morea. Chateaubriand's Itineraire

The rich act as money-lenders, and the Turkish custom-house officers employ poor Jews to value articles for the laying on of duty.

In a state in which the ramifications of power are so singular, we cannot estimate the revenues on the same principles as in more regular governments. Many sums are levied by the pashâs, which never reach the hands of the Tefterdar-Effendi. It is the business of this minister of finances to watch over the great treasury of the empire, into which all the profits arising from the sale of great employments are paid; those arising from the yearly renewal of the *barats*, or firmans, a sort of charters obtained by the zaïms, timariots, and other persons in possession of feodal tenures; the amount of the karatch, or poll-tax, imposed on Jews and Christians; the rent of the domains that are in lease; and the custom-house duties. The *khasné-vekil*, or black eunuch, is entrusted with the general administration of the imperial treasure of the interior, consisting of the products of confiscations and successions to estates, destined to the maintenance of the seraglio. The personal treasure of the sultan is committed to the management of the *khasnadar-aga*, one of the confidential pages. This treasure, accumulated by the savings of the greater part of the sultâns, is kept up by the profits of the coinage.

The office of tchelebi-effendi was created under the reign of Selim III. when the tax was laid on wine, provisions, and the greater part of goods, such as cotton, wool, and silk. The revenue arising from this tax, known under the name of *nizam-jedid*, was appropriated to the maintenance of the new corps of cannoniers, bombardiers, artillery-men, and fusiliers, that had been formed, to the cannon foundry, and the manufacture of muskets, and other useful establishments: but a number of serious revolts having obliged the sultâns twice to abolish that system, it seems uncertain whether it will ever be able to triumph over the national prejudices.[a]

Some authors have asserted that the revenues of the Turkish empire are valued at L.6,670,000,[b] and that the ordinary expenses do not exceed five millions sterling.[c] On such estimates we have no data for delivering an opinion.

Two able military authors have succeeded in showing that the Turkish armies have never been so very numerous as the fears of the vanquished led them to suppose.[d] Soliman II. when he struck terror into Vienna and the whole of Europe, had only a disposable force of 150,000. The composition of the Turkish armies, both in their original and present state, is not consonant with the acknowledged principles of the military art. The Ottoman nation was, in its origin, only a warlike tribe, of which the Agas were the chiefs. This is the name now given to the feudatory proprietors of a zaïm and a timar. They are bound to give personal military service, and in time of war bring to the field one or more *gébélis*, horse or foot soldiers, armed and equipped, according to the extent of their fiefs. The timar differs from the zaïm, by being of inferior value. The zaïms and the timars furnish a militia of 60,000 men. This soldiery long formed the chief strength of the Ottoman empire, and to it the first sultans were chiefly indebted for the astonishing success of their armies. The *spahis* are of older date than the janizaries; they have higher pay, and are considered as sons of mussulmans in easy circumstances. They fight under the same standards as the zaïmets and the timariots. They ought to succeed the latter in the possession of their fiefs, if the regulations of the first sultans were attended to. In the reign of Amurat I. the plan was adopted of taking a fifth part of all the prisoners to form a new corps of infantry, under the name of *Yenitcheri*, a term signifying new soldiers, and which we have converted into Janizaries. The necessities of war produced afterwards another very politic law, which embodied with these troops a tenth part of the children of Christians, and which remained in force till the reign of Amurat IV. Under Soliman I. there were already 161 *odas*, or companies of janizaries at Constantinople, each of which contained from 300 to 800 men. The whole body might then amount to 100,000. At present none but Mahometans are received into it. Many rich persons in the cities get themselves enrolled among the janizaries, with the view of being more effectually protected, and enjoying all the privileges attached to that body. They draw no pay, and obtain an exemption from all military duty by dint of money; accurate observers have rated the janizaries of Constantinople at a number varying from 10 to 20,000 effective men.[e] The rest of the empire may perhaps contain 60,000 janizaries, but they are not prepared to march against a foreign enemy. That body, once so formidable to Europe, is now so only to the Christian subjects of the Turkish empire. The personal courage of the Turks would still make them excellent soldiers, if they would deign to conjoin with it some knowledge of modern tactics. Attempts have been made, and are still making, to introduce European tactics among the Ottoman troops; but indolence conspires with pride to resist the innovation, and to frustrate its success.

The Turkish navy, created by Mahomet II. and rendered formidable under Selim I., fell into decay in the first reigns of the eighteenth century. After it was re-established, the Russians, in 1770, almost entirely destroyed it. Of late they have conceived the project of modelling it by the pattern of that of England. It consists, at present,[f] of thirty ships of the line, with a great number of frigates, and other smaller vessels, particularly row-galleys, xebecs, and other vessels used in the Mediterranean. But they are manned with Greeks, who, with a deficiency of nautical skill, conjoin a strong inclination to betray the cause of their oppressors.

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[a] In 1826, the Sultan having issued orders for raising a body of troops on the European system, the janizaries rose in open rebellion, but were put down with great slaughter, and their order abolished. Disturbances have continued, in consequence, up to the present time; but the Sultan has maintained his ground, and will probably succeed in changing the military system of the nation.—P.

[b] "160,000,000 francs."

[c] "120,000,000 francs."

[d] Marsigli, Stato militare, p. 184. Warnery, sur le Militaire des Turcs, &c. p. 61.

[e] Riedesel, Remarques d'un Voyageur, &c. p. 337. Porter, p. 154.

[f] 1812

To all these departments of the Turkish government we must join the seraglio, or court of the Grand Signor, his sacred retreat, which, however, has been more than once the scene of revolt, and in which fear and anxiety are often concealed in the arms of effeminate indulgence. Thousands of *bostangis*, or well armed gardeners, form a sort of guard to that vast inclosure, filled with palaces and gardens, which is called the seraglio. In the isolated buildings which include the harem, or abode of the women, some hundreds of eunuchs serve as domestics, and at the same time as inspectors of a troop of concubines, which is more or less numerous according to the humour of the sovereign, and among whom love or intrigue may raise even to the rank of *kadunes*, or wives of the sultan. The eunuchs are sometimes white men, sometimes black; some of the latter being from Negroland, others from the Sunda Islands; strangers to every sentiment that constitutes human worth, they succeed admirably in the arts of servility. Their head, called the *kislar-aga*, the ordinary confidential servant of the sultan, often acts a leading part in the state. These savage and stupid slaves have been known to amass enormous fortunes, to appoint the viziers, and to hold both people and sovereign subjected to their ignoble authority.

Such is an abridged view of the Ottoman empire: Disorder and weakness in the different branches of administration, oppression and restlessness in the provinces, the highways overrun with robbers, insurgents in every quarter, neighbours powerful and ambitious, and no foreign alliance or support that can be depended on. The cupidity of nations and of sovereigns has an eye on the different provinces of this miserable empire. The barbarity of its character deprives it of all claim to commiseration in its approaching overthrow; and, while it will shield any aggressor from the charge of injustice, will conceal the selfish motives by which he may be actuated. The contending interests of different powers will prevent Turkey from falling entirely into the hands of any one foreign invader; and, in order that they may not engage in reciprocal contests, they will probably divide the spoil, according to their respective convenience, and their comparative address in negociation. Perhaps they will make a show of liberality, by establishing an independent government among the Greeks. It may be doubted, however, whether the humanity of the Greeks can as yet be trusted for the establishment of an enlightened and benignant policy. If an experiment of this kind should prove unsuccessful, it is easy to predict, that the nation must abandon political individuality, and associate herself in one common submission with one or more neighbours, under a different government. The liberal and humane wait with eager expectation for the total reduction of the Turkish power. The scenes of retaliation on the part of the hitherto oppressed, and certainly bigotted Greeks, which may be in that case expected, may prove equally horrible with those which they have succeeded; but, with the existing prospects of society, they are not likely to become equally lasting, nor to be permitted to prosecute the exclusive establishment of Christianity by inhuman measures, which are equally repugnant to the spirit of our religion, and to the first indefeasible principles of common candour.

A TABLE

Of the Longitudes and Latitudes of the principal places of Turkey in Asia, according to the best observations.

Names of the Places.	Lat. N.	Long. E. of London.	Authorities.
	deg. min. sec.	deg. min. sec.	
Coasts of the Euxine.			
Trebisond	41 2 0	39 43 45	Beauchamp.
Idem	41 2 41	39 36 30	Connaissance des Tems.
Ounieh	. . .	37 19 37	Beauchamp.
Mouths of the Halys	41 32 52	36 11 45	Idem.
Sinope	42 2 16	35 7 12	Connaissance des Tems.
Idem	42 2 17	35 8 15	Beauchamp.
Cape Kerempé	42 5 30	33 6 15	Idem.
Inichi (Elichi)	42 0 26	33 56 30	Idem.
Amassero	41 46 3	32 21 31	Idem.
Eregli	41 17 51	31 27 20	Idem.
Remainder of Asia Minor.			
Island of Marmora, eastern point	40 37 0	27 25 15	D. Galiano, Connaissance des Tems.
Castle of the Dardanelles in Asia	40 9 37	26 15 45	Idem.
Tenedos, N. E. point	39 51 15	25 53 0	Idem.
Cape Baba	39 30 15	25 51 40	Idem.
Brusa	40 7 2	28 58 27	Seetzen, Zach's Correspondence.
Akhissar	39 5 10	27 48 15	Idem.
Smyrna	38 28 55	27 5 0	D. Galiano.
Smyrna	38 28 7	27 13 53	Triesnecke, Archives of Lichtenstern.
Scio, town	38 23 27	. . . .	Seetzen.
Chora (isle of Samos)	37 42 24	. . . .	Idem.
Rhodes (harbour)	36 26 0	28 12 30	Niebuhr, Correspondence of Zach.
Idem	36 28 30	. . . .	De Chazelles, Memoirs of the Academy of Sciences, 1761.
Idem	37 50 0	. . . .	Greaves, Philos. Trans. XV.
Cape of Chelidonia	36 13 25	30 20 25	Galiano.
Angora	39 31 0	32 41 32	Ephem. Géogr. XV.
Kutaieh	39 25 0	29 52 15	Niebuhr. Pococke.
Karahissar (Aphioon)	38 46 0	30 21 35	Idem.
Konieh	37 52 0	32 40 15	Idem.
Malatiah	35 11 0	40 54 45	Schillinger (doubtful.)
Merasche	35 6 0	40 4 15	Idem. (id.)
Cyprus.			
Cape St. Andrew	35 36 30	34 31 45	Galiano.
Larcana (the castle)	34 54 30	33 40 45	Idem.
Larcana (the castle)	34 56 54	33 47 45	Unpublished Travels. Connaissance des Tems. 1811, p. 205.
Nicosia	35 13 14	33 26 45	Idem.
Limasol	34 12 14	32 56 45	Idem.
Baffa (harbour)	34 46 34	32 18 45	Idem.
Cirigna	35 25 0	33 21 45	Idem.
Syria.			
Cape Canzir	36 17 50	35 40 15	D. Galiano.
Latakia	35 32 30	35 44 15	Idem.
Tripoli	34 26 26	35 44 20	Idem.
Cape Blanc	33 11 30	35 7 15	Idem.
Aleppo	36 11 30	37 12 24	Simon, calculated by Monnier and Triesnecker, see Zach's Correspond.
Idem	36 11 33	. . . .	Niebuhr.
Jerusalem (Convent de Terrâ Sanctâ)	31 47 46	35 41 25	Seetzen.
Idem	31 48 0	35 29 15	Paultre, map of Syria.
Country of the Euphrates.			
Erzroom	39 58 35	41 36 0	Beauchamp.
Diarbekir	37 54 0	39 20 15	Simon, calculated by Monnier.[a]
Idem	37 55 30	. . . .	Niebuhr.
Idem	. . . .	39 51 50	Simon, calculated by Triesnecker, in Zach. V. 316.
Merdin	37 18 48	. . . .	Niebuhr.
Mosul	36 20 30	. . . .	Idem.
Bagdad	33 19 50	44 24 45	Beauchamp, Mem. Acad.
Idem	33 19 54	. . . .	Simon.
Idem	33 20 4	. . . .	Niebuhr.
Hilleh or Babylon	33 34 0	54 13 30	Beauchamp, Mem. Acad.
Idem	. . . .	44 24 42	Beauchamp, calculated by Triesnecker, Ephem. Vindob. 1800, p. 397.
Basra or Bassora	30 30 2	. . . .	Niebuhr.

a Compare with Zach's Correspond. III. 571, where the observation of Simon is rectified according to the Philosoph. Transactions.

BOOK XXX.

ARABIA.

Arabia is a sort of peninsula, occupying a position intermediate between the rest of Asia and Africa. Its south-east boundary forms a part of the shore of the Indian Ocean. On the opposite side it is bounded by Syria, a comparatively narrow stripe of country, by which it is separated from the Mediterranean. On the north-east, its variable limits often follow the course of the Euphrates. From Persia it is separated by the Persian Gulph; from Egypt and Abyssinia in Africa, by the Arabian Gulph or Red Sea.

This position renders Arabia a sort of centre to the old continent. Sometimes it has offered a commercial route and intermediate emporium, by which the most distant nations have been connected in their transactions. At other times it has bred in its bosom revolutions, by which the affairs of mankind have been overturned. The shades of antiquity conceal every thing that relates to the consanguinity of the Arabs with the Assyrians and Phenicians, a consanguinity indicated, however, by the mutual analogies of their language; nor are we acquainted with any particulars of the conquests of the ancient kings called *Tobba*, or of the power of the *Homerites*, the princes of the country of Himiar. In the books of Moses and of Job, an interesting picture is given of that patriarchal civilization, of which the manners of the Arabs to this day bear the indelible impression. According to some, Alexander the Great intended to make Arabia, or some situation on its confines, the seat of his mighty empire. The fleet of Nearchus was prepared to make the circuit of this country, when the death of the conqueror terminated all his magnificent designs. Under the Ptolemies, as well as under the Roman government, Egypt received from the Arabians, by the Red Sea, large quantities of valuable articles, which were considered as the productions of Arabia Felix. It was afterwards learned that the finest spices, the ivory, and the murrhine vases,[a] came from India, Carmania, and Serica; but nothing could efface the brilliant idea which had been formed of Arabia. A general of Augustus made an attempt to penetrate to the country of the wealthy *Sabæi*. Arabia was defended by its deserts, and was then, as it is now, divided into several small states, which enjoyed a prosperous commerce.

The cities, the temples, and the palaces of the Arabians, were embellished with the precious metals which the Romans and the Persians had given them in exchange for spices, balm of Mecca, incense, precious stones, and murrhine vases, while the Arabians bought no foreign articles for their own consumption. The art of navigation was as yet low. The riches of India, and probably also of the eastern coast of Africa, were brought to their country in wretched canoes. Between the sailing of their fleets and their return, an interval of five years elapsed. It was only in the first century of our era that the monsoons were understood, and the navigation of the high seas rendered practicable. Such was the kind of civilization of the ancient Arabians, the subject of raving eulogiums among some modern writers. At an early period, however, Arabian colonies appear to have been settled extensively in Africa and in India.

Arabia still flourished in trade and opulence, when, in the sixth century of the Christian era, Mahomet made it the scene of a political and religious revolution. This country, the first seat of a fanatical and conquering sect, soon became the mistress of the finest part of the old continent. The victorious standard of the Crescent was raised on the cold mountains of Tartary, and in the burning sands of Ethiopia. Its dominion extended from Spain to the Molucca islands, perhaps even to the Archipelago of the Carolines. To the south, it went beyond Mozambique and Madagascar.

The Arabians have avoided the fate of other conquering nations, that of being conquered in their turn. They still enjoy their ancient independence. But they have no more Avicennas, Abul-Pharagiuses, or Edrisis. They have reverted to that low degree of civilization from which the keen and comprehensive genius of Mahomet had drawn them, by uniting them into one state. Divided at the present day among many sovereigns, weak, and harassed by a crowd of petty tyrants, Arabia no more presents to the view of the universe those magnificent courts of the caliphs, at which genius and learning found such generous protection, and to which the Europeans, in a comparatively rude state, applied for the rules of the fine arts, and the models of luxury.

The first object to be considered in the description of Arabia, is the nature of the two gulphs which form its eastern and western boundaries. The Persian Gulph is formed by a simple continuation of the basin of the Euphrates. The Arabian Gulph, commonly called the Red Sea, occupies a deep cavity which receives no river. Thus it presents to those who indulge a rage for hypothesis, the appearance of an ancient strait which once united the Indian Ocean and the Mediterranean, and which has been subsequently filled up at its northern extremity. Strabo has compared its shape to that of a broad river. Both of these gulphs are filled with reefs, sand banks, and small islands, and allow but little space for a free and safe navigation. The north-east monsoon, which prevails from the 15th of October to the 15th of April, renders the entrance of the Arabian Gulph easy, which is impossible during the opposite monsoon. These periodical winds have great influence on the height of the tides, so that the extremity of that arm which divides Suez from Arabia may sometimes be

[a] A fine kind of earthenware or porcelain; an article of great luxury among the Romans.—P.

passed on foot.[a] In the Persian Gulph the north-west winds, sometimes interrupted by storms from the south-west, prevail from October to July.[b] The south-east winds, which prevail during the rest of the year, favour the entrance of vessels into this gulph; they bring with them an extreme humidity. The tides and medium level of the gulph are subjected to great variation from the influence of the winds.[c] The shores of both gulphs principally consist of shell limestone rocks. Their bottoms are covered with a carpet of greenish coral; in calm weather the bottom, when it comes into view, is not unlike a series of verdant submarine forests and meadows, and thus affords an agreeable contrast with the gloomy uniformity of arid and sandy country by which it is encircled.[d] The coral of these seas is inferior in quality to that of the Mediterranean.[e] The beautiful fuci attracted the admiration of antiquity,[f] and procured for the Arabian Gulph the name of *Bahr-Sooph* in Hebrew, i. e. *the sea of algæ*. That of the Red Sea, which was applied by the Greeks to all the seas round Arabia, seems to be derived from Edom or Idumea, which also signifies *red*. The wide plains skirting these gulphs appear to have been under water at a period comparatively recent. That which is called the plain of Tehama, runs only along the eastern shore of the Arabian Gulph, whereas the Persian Gulph has on the north the plain of Chaldea and Mesopotamia, in the same direction with the gulph itself. No where, says Pliny, are the depositions from rivers more perceptible than at the mouths of the Euphrates.[g] The strait of Ormuz is not so narrow, nor so encumbered with islands, as that which justly bears the name of *Bab-el-mandeb*, (erroneously written Babelmandel,) "the Gate of Misfortune," or the "Strait of Shipwrecks." We shall take another occasion to describe the islands of these seas; but we may here remark, that, in several parts of the Persian Gulph, and particularly near the island of Bahrein, fresh springs rise in the middle of the salt water,[h] and that the Arabian Gulph contains, in the island of Djebel-Tar, a volcano, which appears to be extinguished.

The principal chain of mountains of Arabia runs nearly parallel with the Red Sea, at a distance of from thirty to eighty miles.[i] It increases in elevation as it extends southward, and it seems certain that it is continued in a line parallel to the shore of the Indian ocean, as far as Omân. This chain probably contains some mountains of great elevation. The pilgrims, in travelling from Damascus to Mecca, perceive, at a distance of two days' journey, Mount Shahâk rising like a tower in the midst of the plain.[k] The interior of Arabia is probably a high plain, inclining towards the Persian Gulph. A great proportion of it is occupied by extensive deserts. But these deserts are separated by small mountainous Oäses, which seem to form a continued line from the south-east of Palestine to Omân.

All the rivers of Arabia are more or less a sort of occasional torrents. In Arabic they receive the common name of *Ooadi*.[l] The dryness of the Arabian soil is almost proverbial; but a Turkish geographer tells us that Nedjed, the interior plateau of Arabia, contains some lakes.[m] Strabo, an eye witness, also mentions lakes which are formed by rivers.

Arabia partakes of the climate of northern Africa. The mountains of Yemen are moistened with regular showers from the middle of June till the end of September; but even then the sky is seldom overcast for twenty-four hours together. During the rest of the year scarcely a cloud is to be seen. At Maskat, and in the mountains of Omân, the rainy season commences in the middle of November, and continues till the middle of February. In the plains of the kingdom of Yemen, a whole year sometimes passes without rain. In July and August, the thermometer rises at Moka to 98° of Fahrenheit's scale, while at Sana, in the mountains, it only reaches 85°. In this last district it sometimes freezes, though rarely.[n] Edrisi mentions mountains in which it freezes even in summer.

It is in the desert bounded by Bassora, Bagdat, Hâleb, and Mecca, that the hot wind is most dreaded, which is known by the name of *Samoom*, *Samiel*, and other analogous terms[o] varied by the different dialects of the Arabs. It blows only during the most intense summer heats. The Arabs of the desert, being accustomed to an atmosphere of great purity, are said to perceive the samoom by its sulphurous odour before it reaches them. Its approach is also indicated by a redness in that quarter of the atmosphere from whence it comes. When it approaches, the Arabs lie flat on the ground, and even the animals hold down their heads. Those who are rash enough to face it are suddenly suffocated, and their bodies are observed to be greatly swollen, a phenomenon imputed by the Arabs to the operation of a subtle poison which it communicates.

The arid deserts of Arabia have discouraged naturalists from exploring them; yet there are numerous mountainous Oäses, shaded with date trees, and other palms, which might deserve to be visited. The sandy plains produce the same plants as those of northern Africa. They are chiefly of the saline and the succulent kind, such as various species belonging to the genera *mesembryanthemum*, *aloe*, *euphorbium*, *stapelia*, and *salsola*. They serve to alleviate the thirst of the camel, and present exhilarating objects to the traveller in the painful journeys of the caravans.

The sea-shores wear a richer and more varied aspect. The numerous rivulets descending from the mountains maintain along their banks an agreeable verdure. The plants which grow in the sands in the neighbourhood of the sea are in their nature the same with those of the deserts. But the banks of the rivers, the valleys, and the plains, enjoy a fertility which forms a complete

[a] Niebuhr, Description de l'Arabie, II. 303, &c. Paris edition.
[b] D'Apres de Mannevillette, Neptune Oriental, Instructions, p. 24.
[c] Kazwyny, Antholog. Arab. de Wahl, p. 192. Arrian. Peripl. mar. Erythr. p. 14, 73, 74.
[d] Forskal, Descrip. anim. p. 132.
[e] Plin. XXXII. 2.
[f] Artemid. apud Strab. Diodor. III. Plin. XIII. 25.
[g] Plin. VI. 27.
[h] Ives, I. 369. Niebuhr, II. 189.
[i] "10 to 30 Fr. leagues."
[k] Seetzen, Zach's Correspondence, XVIII. 389.
[l] *Wadi*.
[m] Hadgi-Khalfah, Djehan Numa, p. 1298. Trad. M.
[n] Niebuhr, I. I. p. 5, &c. Cloupet, Annales des Voyages, X 179
[o] *Sam, smoom, Samel*.

contrast with the aridity of the mountains. Many of the plants of Persia and India, celebrated for their beauty or their usefulness, have been always indigenous in this country. Such are the tamarind, the cotton shrub,[a] the banana or Indian fig, the sugar cane,[b] a species of nutmeg,[c] the betel, and all sorts of melons and pumkins. The chief boast of Arabia consists in two valuable trees. The one is the coffee tree, *Coffæa Arabica;* the other, the balsam tree, or *Amyris opobalsamum.* The balm of Mecca, the produce of this last, is the most fragrant, and sells at the highest price of all the gum-resins. The coffee plantations are cultivated in terraces on the western side of the great mountains of Yemen. A great deal of coffee is to be found in the provinces of Hashid or Bekil, of Kataba, and of Yafa; but the climate of the departments of Oodden, of Koosma, and of Dsjebi, is the most favourable to it, and yields it both of better quality and in great abundance. We are told that the Arabians have prohibited, under the severest penalties, the exportation of this plant, and that the Dutch, French, and English, have notwithstanding found means of transferring it to their colonies; but the coffee of Yemen still preserves its superiority. The Arabians say that they originally obtained it from Abyssinia: perhaps it was in that country that the use and cultivation of this article were first discovered.

In ancient times, Arabia was not less celebrated for incense than for gold; but the incense which the northern nations procured from Arabia Felix was not wholly the produce of that country. That which is cultivated in the south-east part of Arabia, in the neighbourhood of Reshein, Dafar, Merbat, Hasek, and above all in the province of Shahr, is only the kind called *liban* or *oliban* by the Arabians, the quality of which is very inferior. The soil of the mountains where the incense grows is of a clayey texture, and impregnated with nitre. The Arabians procure several sorts of incense from Abyssinia, from Siam, Sumatra, and Java. This is exported by them in great quantities to Turkey; and the poorest of the three kinds of benzoin, sold by the traders, is more valued than the olibanum of Arabia.[d]

There are some groves or thickets on the mountains of Arabia, but no forests properly so called are to be found. In the order of palms, Arabia possesses the date tree, the cocoa, and the fan-leaved palm. Among other trees, natural or cultivated, are to be distinguished the fig, the orange, the sycamore, the plantain or banana, the almond, the apricot, the *acacia vera*, (from which gum-arabic is obtained,) the sensitive plant, and others of the mimosa tribe. The fruit of the quince tree, and the vine, is enjoyed in perfection.[e] Among the shrubs and the plants, the *Ricinus communis*, (the castor oil plant,) and senna, both employed in medicine, are worthy of mention: also the *Gomphræna globosa*, or globe amaranth, the white lily, and the large *Pancratium*, all of distinguished fragrance; the aloe, but inferior to that of Socotora; the styrax, and the sesamum, which supplies the place of the olive.[f]

Wheat, Turkey corn, and doura, cover the plains of Yemen, and of some other fertile parts of the country. The horses are fed on barley, and the asses on beans. Indigo is also cultivated, and a plant which affords a yellow dye called *ouars*, which is exported in large quantity from Moka to Oman, and the *foua*, which is employed as a red dye. The plough is of a simple construction. Mattocks and pick-axes are used instead of spades. The principal cares of agriculture consist in managing the distribution of the water for irrigation, which proceeds from rivulets, wells, or pools. In harvest, the corn crop is pulled up by the roots, and the hay is cut down with a sickle.[g]

The camel has justly been called a living ship, without which the Arab could not cross the seas of sand with which his country is covered. Pliny and Aristotle have given an exact description of the only two distinct species of this genus which are known. The one, which is used in great numbers in Arabia, Egypt, and all the northern half of Africa, has only one hump, and was called by these writers the camel of Arabia. The other, which is found in Persia, in the south of Russia, and in Bucharia, or the ancient Bactriana, has been called the camel of Bactriana. But among the varieties of the Arabian species, that which is best adapted for carrying burdens is distinguished from that which is fitted for running. Diodorus, Strabo, and Isidorus, in speaking of this last, distinguished it by adding the appellative *dromas*, or runner, to the Greek noun for a camel. This term has been converted by the Europeans into dromedary, which they have erroneously extended to all that species which is called the Arabian camel, and is distinguished by its single hump. The Arabian names *hadjin* and *raguahil* seem to apply to the two distinct races of this species, the former being destined for carriage and the latter for running. The word *bacht* is the term for the Bactrian camel.[h] The Arabian and Bactrian species are capable of producing a mixed breed, but it is not certain if this is capable of propagating its kind.

The oxen of Arabia have generally a hump on the back like those of Syria. In western Nedged, butter is used instead of oil.[i] We are not particularly informed about the breed of sheep; they have a thick and broad tail, which they are said to drag behind them on a small carriage;[k] but their wool seems to be coarse, and their flesh none of the most delicate. The wild goat is found in the mountains of Arabia Petræa. The other animals are the jackall, the hyæna, different apes, the jerboa or rat of Pharaoh, antelopes, wild oxen, wolves, foxes, wild boars, and the great and little panther. A degree of respect bordering on adoration is paid to a bird, which is a species of thrush, that comes every year from eastern Persia, and destroys the locusts, the deadly enemies of all vegetation. The esculent locust is found

[a] Plin. XIX. 1. Comp. XII. 10.
[b] Strabo, XVI. 535, 539, (ed. Atreb.) Plin. XII. 8.
[c] Abi Abdallah Ibn Bathouté, an Arabian traveller. MS. in the library of Gotha, (Seetzen.)
[d] Niebuhr, I. 202.
[e] La Roque, Voyage d'Arabie, 268.
[f] Strab. l. c.
[g] Niebuhr, I. 213, *sqq.*
[h] Bochart, Hierozoicon, lib. II. c. 4.
[i] Strabo, XVI. 537.
[k] Barthema, Navig. II. cap. 5—9. Herodot. III. 115.

here, and is esteemed a delicacy.[a] As for birds, the plains are peopled by the partridge, the woods by the guinea fowl, and the mountains by the pheasant. The ostrich is not unknown in the deserts. All the coasts abound with fish. That on the south-east produces the shell called *pinna marina*, with its shining byssus,[b] and immense quantities of sea turtle, which form a chief article of subsistence to whole tribes. Land turtles abound in Arabia, and form the food of Christians during Lent and other fasts. There is a small serpent called *baétan*, marked with white spots, and of a highly venomous nature, its bite being followed by sudden death. The large lizard, or guaril, found here, is said to equal the crocodile in strength.[c]

We must not forget the horses, which are the glory of Arabia. They are divided into two classes, the *kadishi*, or common, and the *koshlani*, or noble kind, which are considered as sprung from the breed of Solomon, and of which the genealogy has been preserved in the country for two thousand years. The greatest care is taken to preserve the purity of the race. They are capable of sustaining great fatigue, can pass entire days without eating, and make an impetuous charge on an enemy. The best are bred by the Bedouins in the northern deserts.

This country also possesses an excellent breed of asses, which are sold high, and have qualities similar to those of the mule. In Yemen the soldiers perform their patroles on asses,[d] and every military service in which parade is not an object. They are also employed by the Mahometan pilgrims in their long and painful journey to Mecca. Niebuhr reckons the progress which the Arabian asses make in a half hour at 1750 paces, double those of a man. The large Arabian camels make 775, and the smaller ones 500. The trot of the camel is hard and disagreeable.

According to Niebuhr, Arabia neither contains mines of gold nor silver, though a small quantity of the latter metal is contained in the lead obtained from the province of Omân. There are iron mines in the district of Saadé in the north of Yemen, but the iron which they yield is brittle. The onyx is found in Yemen. The agate called the moka-stone comes from Surat, and the finest cornelians are brought from the gulf of Cambay.[e] Niebuhr denies that Arabia produces any precious stones, and maintains that they are all brought from India. But the positive and unanimous testimony of the ancients will not permit us to doubt of the former wealth of the Arabian mines.[f] The country is in itself vast, and there is no reason whatever for refusing our assent to these accounts. It was in the mountains of Yemen that mines of gold were formerly worked; sometimes it was found in the body of the rocks, at others in loose nodules on the surface. Rock salt is still worked near Loheïa, and in several other places. The town of Gerra on the Persian Gulph was entirely built of this substance The *aromatites*, or aromatic stone of the ancients,[g] is probably amber, and the *Smaragdus cholos*, or inferior emerald, which, according to Pliny, was used as an ornamental stone in the walls of houses, was probably diallage.[h] Niebuhr observed in Yemen five-sided columns of basalt, blue alabaster, selenite, and various spars.

We now proceed to examine Arabia, as divided into provinces. By the ancients, this country was divided into three unequal portions; Arabia Petræa, a small province situated between Egypt and Palestine, at the northern extremity of the Red Sea; Arabia Deserta, which extended towards the Euphrates, and towards the centre; and Arabia Felix, which comprehended the remainder. The modern divisions, as given by Niebuhr, are quite different. The series of deserts in the centre forms an extensive province called Nedjed. Hedjas is on the shore of the Red Sea, a little north of the middle of its length, and contains Mecca and Medina. Yemen is to the south of this, extending to the straits of Bab-el-mandeb. Hadramaut lies along the shore of the Indian Ocean. Omân lies south of the entrance of the Persian Gulph, and Lahsa or Hajar[i] occupies the western shore of that gulph.

The peninsula formed by the gulphs of Ailah and Suez attracts the attention of travellers by its ancient celebrity. There is nothing at all interesting in the town of Ailah, which gives its name to the eastern gulph, nor in that of Karak, which lies to the south of the Dead Sea, nor in the harbour of El Tor. Mount Sinai is an enormous mass of granite rocks with a Greek convent at the bottom, called the convent of St. Catharine. It is the highest summit of a chain of mountains, called by the Arabians Djébel Moosa, and which requires a journey of several days to go entirely round it. This chain is partly composed of sand-stone. It contains several fertile valleys, in which are gardens which produce grapes, pears, dates, and other excellent fruits. These are taken to Cairo, where they are sold at a high price; but the general aspect of this peninsula is that of a frightful sterility. It is the favourite soil of the rose of Jericho, the bitter apple, and *apocynum* or dog's bane. There are also various shrubs, such as the *acacia vera*, or Egyptian thorn, which furnishes gum-arabic, a substance often used as food in cases of necessity;[k] the tamarind tree, from which, in the months of June and July, a sweet and aromatic juice exudes, supposed to be the manna of the Scriptures,[l] and still called in that country *el-mann*;[m] also the ban, or *Balanus myrepsica*,[n] from which a much esteemed oil is obtained.[o] The caper, the rose-laurel, (*nerium*,) the cotton plant, and various other shrubs, form scattered tufts of verdure

[a] Bochart, Hierozoicon, p. II. lib. IV. cap. 6. Forskal, Descript. anim. p. 81.
[b] Ptolem. Geo. VI. cap. 7.
[c] Kazwyni and Abdallatif in Bochart, part I. lib. IV. cap. 3.
[d] Grandpré, Voyage au Bengale. Compared with Bochart, Hieroz. part I. lib. II. cap. 13.
[e] Niebuhr, I. 197.
[f] Job, ch. 28. v. 45 Abulfedæ, Arabia, edit. Gagn. p. 45. Teiphasch, excerpta de gemmis, edit. Rau. p. 96—102.
[g] Pliny, XXXVII. 10.
[h] Pliny, XXXVII. 5.
[i] *Hejer*—d'Anville.
[k] Hasselquist's Journey to Palestine, (in German,) p. 570.
[l] Seetzen, Zach's Correspondence, XVII. 151.
[m] The manna is still found in the valley of Araba, where it drops from the sprigs of several trees, particularly the Gharrab. It is collected by the Arabs, who make cakes of it, and eat it with butter.—*Burckhardt.*—P.
[n] Guilandina Moringa, Linn. Hyperanthera Moringa, Willd. Moringa Pers. Juss. Ben-nut.—P.
[o] P. Belon, Observations sur Diverses Singularités, p. 126. Celsii, Hierobotan, II. p. 1.

in the midst of the dark rocks of granite, jasper, and sienite, and in plains covered with sand and pebbles. The few Arabs who wander in this desert seem to lead very abstemious lives. They have opportunities, however, of hunting, as gazels and other sorts of game are to be found in considerable number.[a] The coasts of this peninsula are lined with coral reefs, and covered with innumerable petrifactions.

Sacred history and tradition have given Sinai and Horeb a character of sanctity in the eyes of Jews, Christians, and Mahometans. The latter, on their return from Medina, often honour with the sacrifice of a few lambs the place where the Almighty condescended to reveal himself to Moses in all his glory. Djébel-el-mokatteb is a great rock, situated on the road from Sinai to Suez, and covered with hieroglyphics, which have afforded ample matter for discussion to the learned. Niebuhr, in his visit to this spot, found a cemetery filled with magnificent grave-stones, on which beautiful hieroglyphics were carved; monuments which prove the former existence of populous and flourishing cities.

On the route of the great caravan of pilgrims, are the towns of Heddijé, Maan, and others, situated in fertile Oäses in the midst of Hedjaz, a country somewhat less desert than the neighbourhood of Sinai. On the coast, which the caravan leaves on their right, are some trifling remains of Madian, Haura, and some other places. On their left they have the city of Medina, which contains the tomb of Mahomet. The pilgrims are not obliged to visit this tomb. The tomb itself is as simple as can be imagined; but we are told that the mosque founded by the prophet is supported by 400 columns, and illuminated with 300 lamps, which are constantly burning. Here are also the tombs of Abu-bekr, and Omar the successor of Mahomet. Yambo is the port of Medina.

All the soil pertaining to the city of Mecca is esteemed sacred. This ancient capital of Arabia was known to the Greeks under the name of Macoraba. The latter part of this word denotes its greatness; which, however, even in its most flourishing times, was perhaps less than one fourth of Paris. The soil is a barren surface of rock; the water of the holy well of Zemzem is brackish and bitter.[b] The pastures are at a distance from the city; the fruits used here are brought from the gardens of Tayef, situated among mountains, where it sometimes freezes even in summer.[c] The Koreishites, who ruled at one time in Mecca, were famed among the Arabians for their courage. They were prevented by the sterility of the soil from encouraging agriculture; but by means of the port of Jedda, which was only forty miles off, they enjoyed a most favourable position for commercial enterprises. An easy intercourse was kept up with Abyssinia; and the treasures of Africa were carried across the peninsula as far as Katif, in the province of Hejer; there they were embarked on the same rafts with the pearls of the Persian Gulph, and were carried to the mouth of the Euphrates. Mecca is placed at a distance of about thirty days journey from Yemen on the right, and from Syria on the left. The caravans of Arabia used to pass the winter in the former country, and the summer in the latter. They met the merchants from India, who were thus repaid for the toils and perils of the navigation of the Red Sea. The camels of the Koreishites received a cargo of perfumes at the markets of Sana and Merab, or in the harbours of Omân and of Aden. They also brought grain and manufactured goods from Bostra and Damascus.[d]

That commerce has now changed its direction. Mecca at present subsists only by the resort of pilgrims who come to present their homage of veneration to the holy *Kaaba*, or chief temple of the Mahometans. In the common geographical works it has been usual to describe this temple as unparalleled for magnificence, with its hundred gates, and its gilded dome; but, from Niebuhr's description, the Kaaba seems to have more the character of an ancient Indian or Siamese temple than of a mosque. It is an uncovered open square, surrounded with colonnades, and adorned with minarets instead of pyramids and obelisks. This enclosure contains five or six chapels or houses of prayer. In the centre is a small square building, called more particularly the Kaaba, the depository of a black stone, which seems to have been an ancient object of adoration among the Arabians.[e] Before the time of Mahomet there was a celebrated temple here,[f] to which all the tribes of Arabia resorted, who, after going seven times round this sacred building, kissed the black stone with respectful homage.[g] Sheep and camels were offered in sacrifice to the 360 images which this temple contained, and which Mahomet destroyed. Probably these were the spirits supposed to preside over the days of the year, and the god *Hobal*, placed on the top of the temple, represented the sun.

The mountains of Hedjaz contain several petty sovereignties. The Arabs who live here do not dwell in tents like those of the plains. They have towns and walled villages; and they defend themselves by means of small forts built on rocks and rugged mountains. Among these states is the district of Kheibar, which is north-east from Medina, and which is said to be inhabited by independent Jews, who live under their own sheiks in the manner of the Arabs. The Turks hold them in detestation, and accuse them of pillaging their caravans. The Jews of Kheibar seem to have no connection with those who live in the cities on the confines of Arabia. Perhaps they belong to the sect of Karaites, who are more odious to the pharisaical Jews[h] than even the Mahometans and the Christians.

On the east of Hedjaz are the vast deserts of Nedjed. According to Niebuhr, this wide country extends from the desert of Syria on the north to Yemen on the south, and from Hedjaz on the west to Irac-Arabi on the east. Thus it chiefly comprehends the country called Arabia Deserta by geographers, a principle of division unknown to the Arabians. That part of the province

[a] Sicard, Nouveaux, Mém. des Missions dans le Levant, I. p. 26.—(Paris, 1715.) Pocoke, Breuning, Monconys, Thevenot, etc. Niebuhr, Description, II. p. 176, etc.

[b] Abulfeda, edit. Gagn. p. 29. Bakoui, Notices et Extraits, II. 417. Barthema, ap. Ramus. Navig. I. 151. Niebuhr.

[c] Abulfeda, Gagn. p. 43. Edrisi, clim. II. p. 5.

[d] Massoudi, apud Schultens, Historia Ioctanid. p. 181.

[e] Max. Tyr. Suid. &c. apud. Asseman, Biblioth. Orient. p. 534.

[f] Diod. I. 3.

[g] Pococke, Specim. Histor. p. 311. Reland. de Relig. Mohammed, p. 88, &c. Mill. Dissertat. de Mohammedismo, p. 18, &c.

[h] "Juifs pharisiens," Jews of the sect of Pharisees.

more strictly known by the name of Nedjed is mountainous, covered with towns and villages, and filled with small principalities, almost every small town being governed by an independent sheïk. It abounds in all sorts of fruit, particularly dates. There are few rivers; and even that of Astan, which is marked in M. d'Anville's map as flowing from a considerable distance in the interior into the Persian Gulph, is nothing more than a *wadi*, or torrent, which runs only after heavy rains.

This province contains many districts. That of El-Ared, called sometimes Nedjed-el-ared, is conterminous with Hajar or Lahsa on the east. In it is Hanifa, a canton once celebrated, but best known in modern times by the name of Daraïe.[a] One of its dependencies is Aijana, the birth place of the new prophet Wahhab. Niebuhr places the district of Kerdje in the south-west part of Nedjed, and consequently on the confines of Yemen. In this, however, he was certainly mistaken. Khardg or Kerdje, according to the Arabians, is the same canton which has Yemama for its capital, a place of great note in the days of Mahomet, as the residence of the rival prophet Moseilama. It forms, with the cities of Lahsa and Yebrin, an equilateral triangle, of which each side is reckoned a distance of three days journey.[b] The mountain El-Ared, of Arabian geographers, seems to be a ridge of limestone rocks, extending from north to south, abrupt to the west, and gently inclining to the east.[c] It is the *Montes Marithi* of Ptolemy.

A traveller from Damascus, (Yoosoof-el-Milky,[d]) has procured for us some recent information respecting the interior of Arabia. By his account, it appears, that from the confines of the canton of Haurân to the banks of the Euphrates, the whole soil is one immense plain, without rivers or permanent springs, without the slightest elevation, without any trace of town or village, but affording vigorous growth to a few thorny shrubs, by which the traveller's eye is somewhat relieved. The name of this plain is El-Hamad, the *Al-dahna* of Abulfeda and d'Anville. This is the scene of the wanderings of different Arab tribes, as the Anaseh, the Beni-Shaher, and the Szeleb.[e] The tribe Montefik occupies the banks of the Euphrates from Korna to Arasje. To the south of this plain the caravans of Damascus on leaving Esrak, a journey of a day and a half from Bostra, follow for seven days the tract of a valley, or the dry bed of a river, called *Wadi-Arab-es-Szyrhan*. This tract leading south-east, brings them to the canton of *Djof*, called also *Djof-es-Szyrhan*.[f] At this place there is a high pyramidal tower. The inhabitants live in a state of perpetual civil war. It is said that there are wild dogs in the vicinity, which are used for food. After this, in the route of the caravan, there is a desert of stones of two days journey, and another of sand of three days, where wild oxen are met with, which sometimes afford opportunities for the chase. Behind this desert rises mount Shammar, covered with forests and villages; in height and extent it resembles mount Libanus. Here our traveller ended his journey, without even entering the canton of Shammar. This is the *Mons Zametas* of Ptolemy, and the *Belâd-shemer* of d'Anville, though that geographer places it too far to the west, and perhaps a little too far south. Our traveller learned that the town of Derreia,[g] the capital of the Wahabees, is ten days journey from mount Shammar. Derreia is reckoned among the Arabs to be at the same distance from the Persian Gulph; but Mr. Reinaud, an English traveller, who went from Bassora by sea to Khatif, had a journey of seven days to the town of Asha, a place where there are horses of singular beauty, though only fifty-five inches high;[h] [i] he had then eight days journey across the desert before he arrived at Derreia, which he calls Drahia. It is an inconsiderable place, but handsome according to the Arabian style. The sides of the neighbouring hills produce all sorts of fruits. Excellent horses, and numerous flocks of black sheep, are reared here.[k]

To the south and south-east, Nedjed is separated from Yemen and from Omân by the desert of Ahkaf, which, according to tradition, was once a terrestrial paradise, inhabited by an impious race of giants called Aadites, who were destroyed by a deluge of sand, though their language continues to be spoken in the islands of Kuria and Muria.[l]

The towns of Nedjed carry on a considerable trade with one another, and with the neighbouring parts of Hedjaz, Yemen, and Lahsa; and we hope that, by means of it, some European traveller may find an opportunity of penetrating into the interior of Arabia, and acquiring for us a more exact knowledge of it. It is from Nedjed that the formidable sect of the Wahabees has sprung, whose power has excited the attention of Asia and of Europe.[m]

According to a tradition prevalent in Arabia, and especially in Yemen, there was a poor shepherd of the name of Soliman, who saw in a dream a flame proceeding from his body, which extended itself to a distance round him, destroying every thing in its way. He consulted the wise men on the meaning of this vision, and they answered him that it predicted the rising of a new political power which was to be established by his son. This prediction proved correct; for if it did not receive its accomplishment in the person of Abd-el-Wahab, the son of that individual, it certainly did in that of the next of the race, Sheik-Mohammed, who was in fact the founder of the sect which assumed the name of his father Wahab. He contrived to take advantage of this famous vision among his countrymen. He persuaded them that he was a direct descendant of Mahomet, whose name he assumed. His doctrines were few and simple He enjoined the worship of one God, eternal, omnipotent, just and merciful, a dispenser of rewards and punishments. The Koran he maintained to be a book written in heaven by the angels. Its precepts are to be followed, but all the Mussulman traditions are to be rejected. Mahomet he gave out to be a wise man highly favoured by God, but entitled to none of that religious

[a] Niebuhr, Descr. II. p. 203. [b] Abulfeda, Gagn. p. 16.
[c] Idem, Proleg. p. 182, vers. Reiskii. Rommel, Arabia Abulf. p. 86. Hadgi-Khalfah, Djehan-Numa, p. 1450, 1451, MS. Zach's Corresp. XVIII. p. 303.
[d] Seetzen, Annales des Voyages, VIII. 281.
[e] Al-Giuf, D'Anville.
[f] "Dareïé or Driyah."
[g] "50 Fr. inches."
[h] Reinaud's Letter to Seetzen, Zach. Corresp. Sept. 1805.
[i] Compare with Hadgi-Khalfah, 1451, &c.
[k] Hadgi-Khalfah, p. 1358
[l] Histoire des Wahabis, par M. L. A. Paris, 1810. Notice sur les Wahabis, par M. Rousseau, consul-general, á la suite de sa description du pachalic de Bagdad, 1809.

homage which is paid to him. He said that God, offended at this species of worship, had sent *him* to the earth to undeceive mankind, and that all those who should refuse his instructions were to be utterly extirpated.

At first he disseminated his doctrines in secret, and made some proselytes. For the same purpose he took a journey into Syria. Not succeeding there, he returned to Arabia after an absence of three years. Here he was more fortunate, and found a protector in an Arabian sheik, called *Ebn-Sehood*, who was descended from the Negedis, the native tribe of *Sheik-Mohammed*. This Ebn-Sehood was a man of an ardent and courageous spirit, who, after raising himself to the situation of the chief of his tribe, had subjected to it two other tribes belonging to Yemen, and drawn over to his party all the wandering Arabs of that country. With this company he found himself in a condition to make frequent excursions, and in fifteen years his conquests were extensive. Desirous of giving them a still wider extension, he considered Mohammed as a person who might materially promote his views by inspiring his Arabs with additional ardour and enthusiasm. He therefore aided the propagation of a doctrine which had already made some progress among his people; and Mohammed readily connected himself with him as promising the most solid support to his new sect. The whole of the people soon embraced his tenets. The new worship now assumed a regular form. The son of Abd-el-Wahab was proclaimed chief pontiff of the Wahabees. Ebn-Sehood held the temporal power under the titles of prince and general; and this partition of authority is preserved among the respective descendants of the two chiefs, who chose for their capital Drahia or Derreia, in the desert to the south-east of Bassora.

Ebn-Sehood next proceeded to realize his mighty projects of aggrandizement. He formed a well-disciplined army; and the sheik Mohammed, by his harangues, inflamed their enthusiasm. Sehood died in the midst of these projects, but his son, Abd-el-Azis, inherited his courage and his zeal. When he wished to subjugate any tribe, his method was to summon it to believe in the Koran, as explained by him, threatening extermination in case of refusal. When they preferred the latter alternative, he put them all to the sword, sparing the women and the children, and carried off all the property of the conquered. If, on the contrary, the tribe agreed to submit, Abd-el-Azis gave them a governor, claimed a tenth part of their flocks, their money, their moveables, and even of the men, the latter being drawn by lot. By these measures he amassed great treasures in a short time, and collected a numerous army. The latter is estimated at 120,000 men. The Bedouin Arabs, one after another, submitted to a power which now embraces all that vast desert which is bounded by the Red Sea, the Persian Gulph, and the environs of Aleppo and Damascus.

The Wahabees hold the other Mahometans in abhorrence; yet they retain many of their ceremonies; their circumcision, their forms of prayer, their ablutions, their days of abstinence, the fast of Ramadan, and their holidays: but their mosques have no decorations, no minarets nor cupolas. They make no professions of respect for the memory of shieks and of imâns, and bury their dead without pomp or ceremony. They live on barley bread, dates, locusts, and fish. It is rarely that they eat mutton or rice. Coffee is forbidden. Their clothes and their houses are as simple as possible. This nation is divided into three classes; the military, agriculturists, and mechanics; for they work at different mechanical arts. Their basket work, their woollen and cotton cloths, and their manufactures in copper and iron, are not inferior to those of the other Arabians.

Descending from the higher parts of Arabia, we enter Hajar or Hejer, a province lying along the western shore of the Persian Gulph. The tribe of Beni-Khaled formerly were its sovereigns, but it now forms part of the Wahabee territory. Lahsa, a considerable town on the river Astan, is its capital, and sometimes gives its name to the whole province. Katiff seems to be the ancient *Gerra*, which was built of rock salt. Its inhabitants live by the pearl fishery; and when not rich enough to fish on their own account, they hire themselves out for this employment to foreign merchants. The ruins of an old Portuguese fort are still to be seen here. Koneit is another considerable town, called *Grain* by the Persians. Its inhabitants also live by the pearl and other fisheries, on the coast of Bahrein. They are said to amount in number to 10,000. The whole of this coast is very populous. It abounds in dates, rice, and cotton: the rivulets are fringed with lilies and privets. But they suffer dismal encroachments from the drifting sand, by which whole cantons are sometimes invaded.[a] Taroot, a small town to the east of Katiff, has excellent vineyards, which are sometimes flooded by the tides. It is here that we must place the *regio Macina* of Strabo, where the vines, raised in baskets of rushes, were sometimes moved out of their situation by the waters of the sea, and afterwards replaced by means of oars.[b] In some of the towns of Hajar there are woollen manufactures, particularly of a kind of cloaks called *abbas*.

The isles of Baharein, or Bahrein, in the Persian Gulph near the Arabian shore, may be considered as part of Hajar. This place is remarkable for the valuable pearl fishery which is carried on in its neighbourhood in the months of June, July, and August; a fishery which, in the sixteenth century, was estimated at a produce of 500,000 ducats.[c] The name Baharein signifies two seas, and seems to be of modern application; for Abulfeda, as well as the Arabians of Lahsa, call the large island Aual, a name which d'Anville has erroneously transferred to the peninsula of Ser, situated about 300 miles to the east. The large island has a fortified town, and abounds in dates, according to modern accounts. The ancients have described it more favourably under the name of Tylos. Flat, and little wooded, it produced figs, grapes, palms, and cotton. A tree, with flowers and leaves like those of the rose, was remarked for an uncommon sensibility to light, by contracting in the night, and opening during day. The tamarind, which in Europe is a shrub, grew here to the size of a strong tree; as there was not that proportion of rain which was requisite to vegetation, the water of

[a] Hadgi-Khalfah, p. 1370. Niebuhr, II. p. 198.
[b] Abulfeda, Gagn. p. 13. Strabo, XVI. 528. edit. Atreb.
[c] Texeira, Chronic. Armuziæ, p. 19.

the sea was used for irrigating the orchards; the shores were lined with mangroves.[a] But from any thing we can now learn, the country must have changed.[b]

Beyond a wide unknown tract, in which the cities of Mascalat and Julfar are situated, we come to the territory of Omân. It is filled with mountains, which almost every where extend to the sea. This country abounds in grain and fruit. The sea along its coasts is so full of fish, that cows, asses, and other animals, are regularly fed on them, and they are employed as manure to the fields. Its dates form an article of exportation. It contains copper and lead mines. The Imân, the most powerful prince of the country, resides at Rostak. But Maskat, or Muscat,[c] is the largest city, and best known to Europeans. It is situated at the southern extremity of a bay about 900 geometric paces long, and 400 wide. On the east and west this bay is bordered with steep rocks, which afford shelter to the largest vessels against every wind. On either side of this fine harbour are some batteries and small forts. The town, where it is not defended by nature, is inclosed by a wall. Beyond this wall a pretty large plain opens, bounded also by rocks, which have only three narrow outlets. Maskat was in ancient times, as it is now, the entrepôt of the merchandize of Arabia, Persia, and the Indies. In 1508 the city was taken by the Portuguese. The prince himself is engaged in commerce. He has some armed vessels, in which he every year imports slaves, ivory, and other commodities, from Africa.

The inhabitants of Omân are the best seamen in Arabia. They have small merchant vessels called *trankis*, the sails of which are not formed of matting as in Yemen, but of canvas as in Europe. These vessels are wide in proportion to their length, very low in the fore part, and very high behind. They have this peculiarity, that the planks are not nailed, but tied or sewed together. The greater part of the Imân's soldiers are Caffre slaves.[d]

The independent principality of Sehr lies towards Cape Mossandom, which commands the entrance of the Persian Gulph. Omân, and consequently all Arabia, terminates to the east by Cape Ras-al-Hhad, commonly called Rosalgate.

From this the southern coast first runs in a south-south-west direction, as far as Cape Kanseli, then south-west to the straits of Babelmandeb. The eastern part of this shore is lined with coral reefs and shallows. Strabo says that trees grew here which were flooded at high water. These were probably mangroves. Next comes the mountainous country called Seger, where frankincense grows. Its ports are Hasec on the great gulf of Kuria Muria, surrounded with isles; likewise Merbat and Dafar. Behind the country of frankincense lies Mahrah, a large hilly district, where a peculiar language is spoken. All these cantons seem to belong to Hadramaut, taking the name in its widest sense; but Hadramaut Proper is on the south-west, and adjoining to Yemen. Doan in this country is a large and fine town, but its inland situation prevents us from obtaining an accurate knowledge of it. It is twenty-five days' journey from Sana, and eleven from Keshin. This last town is on the sea-shore. Its inhabitants are remarked for their politeness to Europeans and other strangers. Its sheik possesses a considerable district in Arabia, besides the island of Socotora, celebrated for its aloes.[e] The sheik of Shibam is one of the most powerful in the mountains where the Kabails live. Hadramaut was celebrated in the days of Augustus for the bravery of its inhabitants. In several parts of it there are mountainous and very fertile countries, with interposed vallies, which are well watered by the mountain streams. From the different ports of this country there is an exportation for Maskat and the Indies, of frankincense, myrrh, gum, dragon's blood, and aloes; and for Yemen, of stuffs, carpets, and large knives, called *jambea*, which the Arabs wear in their girdles.

The finest province of Arabia remains to be described. It once formed a large kingdom under the name of Saba. Subjugated by Mahomet, and afterwards by Saladin, Yemen at last fell under a sort of subjection to the Mameluke sultans of Egypt. In 1517, having recovered its liberty through the declining power of the Mamelukes, it was threatened with a Turkish invasion; but in 1630 Amurat IV. recognised Sejid-khassen-ibn-Mohammed, as king of Yemen, reserving to himself a nominal sovereignty. Since that time its kings have lost several provinces, especially on the north and east. Still the state of Yemen contains nearly 20,000 square miles,[f] and probably a million of souls. The king is at the same time the chief of the sect of Zeidites, which predominates in the whole of Yemen. Hence this prince at first took the title of Imân, which applies in Turkey to the simple officiating priests attached to the mosques, but in Arabia and Persia, among the adherents of the sects of Zeidites and Shiites, means a doctor, or a successor of the great prophet. These Imâns, however, soon after stamped on their coin the more impo-

[a] Theophrast. Hist. Plant. IV. 9. V. 6. De Causis, Plant. II. 7. Compare with Pliny, XII. 10, 11. XVI. 41. Arrian, VII.

[b] The following information respecting the Arabian coast of the Persian Gulph, has been furnished by the gentlemen employed by the E. India Company, in surveying the Gulph, 1820—1825. From *Grane*, an important trade is carried on, by the Arabs, with India. The land is low, and partly cultivated; the port large. Off the mouth of it is the island *Phaleche*, 18 miles in circumference. *Katiff* is a large town, on a shallow bay. Off its mouth is *Tirhoot*, a low island covered with date trees Thence the coast stretches directly S. to the deep bay, called *Dooat-es-Elva*, S. of *Bahrein*, in 26° 10′ N. Its N. shore, as far as *Bahrein*, is fronted with reefs. *Ayndar*, on the Dooat, is the port of *Deriah*, the capital of the Wahabees. The country around it is barren. From the head of the Dooat, the coast turns northerly to *Ras Rezzan*. *Bahrein* I. is at the entrance of the Dooat. It has long been celebrated for its pearl fishery. It has been successively occupied by the Portuguese, Persians, and Arabs, who took possession of it in 1790. It is 80 miles in circumference. One fifth only is cultivated. It is fertile, well watered, and populous, containing 40,000 inhabitants; its dependencies 20,000. The boats employed in the pearl fishery amount to 2400, each carrying from 8 to 20 men. The annual amount of pearls obtained, is from 16 to 20 lacs. 140 vessels are employed in trade. The capital is *Manama*. Its harbour is between a line of reefs to the N. and W., and the islands *Mahrag* and *Ared* to the E. *Ruffin* is 7 miles inland, on a hill, and now poor and decayed. On the E. coast are the ruins of a large town, 25 years ago the capital. There are remains of a Portuguese fort and light-house,(*phare*,) and of reservoirs, and an ancient mosque. The whole island is capable of cultivation. Its chief productions are wheat, barley, and dates. Off the coast, many fresh springs rise in the sea. E. of *Bahrein*, on the island of *Mavi*, are the ruins of *Zabarra*, which are very extensive.—P.

[c] *Muscate.*

[d] Niebuhr, Descrip. de l'Arabie, II. p. 141--160.

[e] To be described in our account of Africa.

[f] "2500 sq. Fr. leagues."

sing title of *Emir-al-mumenim*, or "prince of the faithful." The true followers of their sect are said to honour them as caliphs. The throne is hereditary. The Emir is independent, and acknowledges no superior in temporal or spiritual concerns. He retains the power of making peace and war. Yet the brave and proud Arabian never submits to the least abuse of power. The emir cannot even inflict death on a Jew or a pagan, unless the accused has been tried before the sovereign tribunal of Sana, composed of a number of cadis, and of which the Emir is only the president. If the Emir evinces an inclination to despotism he is dethroned. Persons of rank are called *fakis*. The governors of districts are called *dolas*, and when they are of distinguished birth, they are denominated *walis*. The magistrate of an ungarrisoned town is called *sheik*; if the seat of his authority is a place of greater consequence, he receives the title of *emir*. There are also public controllers to inspect the conduct of the governors. But we need not detain ourselves longer with these details; they will be found at considerable length in the work of Niebuhr.

The armed force kept on foot during peace consists of 4000 infantry, and 1000 cavalry. The soldiers, according to the oriental custom, wear no uniform; they are not instructed in any species of tactics, and scarcely know how to manage a musket. Yemen has no marine force; the vessels are rudely built, and their sails are of matting.

The annual revenues of the prince amount, according to Niebuhr, to nearly L.80,000 sterling.[a] This traveller conceives that they arise chiefly from the duties laid on the exportation of coffee. Besides this valuable article, Yemen exports aloes; myrrh, of which the best comes from Abyssinia; also olibanum, or the inferior sort of frankincense, senna, ivory, and gold, from Abyssinia. The imports from Europe consist of iron, steel, cannons, lead, tin, cochineal, mirrors, knives, sabres, cut glass, and false pearls. The Jews are here the manufacturers in gold and silver, and even coin the money. Some muskets are made in the country, but they are indifferently executed. There is a manufactory of glass at Moka. There are also in Yemen some manufactures of cloths, but generally of a coarse quality. A very active trade is carried on by the Jews, who amount to 5000 families; but jealousy and superstition combine their influence to persecute this unhappy race.

Yemen, the most powerful kingdom of Arabia, is divided into several departments, and in a more general way, into the high country, called in Arabic Djebal, and the low country, which is called Tehama. The chief city is Sana, situated at the foot of a mountain called Nikkum. According to Niebuhr, this city is of no great extent; its circumference being about an hour's walk, including also some gardens. The walls are of brick. It has seven gates, and several handsome mosques and palaces, some of them built of burnt bricks, and others of stone. The common houses are of bricks dried in the sun. It has several *simseras* or caravanseras for merchants and travellers.[b] Fuel is very necessary here, and extremely scarce, but the country contains some coal mines and some turf. Pliny says that the Arabians warmed themselves with odoriferous wood, but of this no modern fact furnishes a confirmation. The fruits are excellent, especially the grapes, of which there are several varieties.

According to the obscure accounts of Pliny and of Strabo, Mareb or Mariaba was the ancient metropolis of Yemen. D'Anville endeavours to identify that place with the celebrated city of Saba, known to the Hebrews, and mentioned by Ptolemy, Agatharchides, and some other Greek geographers. At the present day this town has become the capital of the country of Djof, which is now independent of the Imân of Yemèn. In a contiguous valley, about sixteen miles long,[c] six or seven rivulets join their streams. Some of them contain fish, and retain their water the whole year round. The two chains of mountains approach so near each other to the east, that a person may pass from the one to the other in five or six minutes. It is said that this opening was once shut up by a thick wall, which confined the rain water to be distributed through the fields and gardens situated along the bottom of these heights. This great dyke was esteemed among the Arabians one of the wonders of the world. The Arabian historians mention the bursting of the dyke, and the consequent disasters, as forming the commencement of a historical epoch, of which the learned have not been able to make out any consistent or probable account.[d]

In the Djebal or high country, the Imân possesses the town of Damar, the seat of the great university of the Zeidites; of Doran, in which there are large magazines of grain cut in the rocks; of Djobla, distinguished for the pavement of its streets; Taez, which boasts of its elegant mosques. Koosma is a town which is entered only by climbing up steps. It is a day's journey to ascend to it from the Tehama. Mnasek is a place where all the houses are cut out of the solid rock.

Independent Djebal contains large cantons, among which is Sahan, of which Saade is the chief place. It produces grapes and other fruits in abundance, and has some iron mines which are worked. The inhabitants of this province have little intercourse with strangers. Their dialect is supposed to come nearer that of the Koran than any other, though they know little more of that book than the name. They live on flesh, honey, milk, and pulse. They marry later in life than any other Arabians, live to a very advanced age, and retain their eye-sight till the day of their death. By plundering their neighbours they enable themselves to exercise hospitality to visitors. Nedjeran, a small domain, is situated in an agreeable country, supplied abundantly with water, and lies to the east-north-east of Saade, at a distance of three days' journey. It produces great abundance of corn and fruit, particularly dates. There is a canton called Hashid-oul-Bekil, the numerous sheiks of which form a league, which is very formidable to the Imân.

Even in the plain, or Tehama, there are small states

[a] "480,000 crowns (Denmark,) or about 1,900,000 francs."
[b] Niebuhr, I. p. 230, (in German.) Edrisi. clim. I. p. 6. Ibn al Ouardi, part. 10.
[c] "6 Fr. leagues."
[d] Reiske, de Arabum epochâ vetustissimâ, &c. Lips. 1748.

which have braved the power of this prince. Such is Aden, a town celebrated from the remotest periods for its commerce and the excellence of its harbour on the Indian Ocean. The Arabian geographers tell us that it maintained an extensive intercourse with India and China in the 12th, 13th, and 14th centuries; there the riches of the east were accumulated on a tract of rock destitute of water and of trees.[a] Aden, devastated in the wars of the Turks and Portuguese, has lost its commerce since it submitted to the Imân. This prince is master of the best towns on the Arabian Gulf, such as Moka, the name of which sounds so delightful in the ears of every one who is curious in coffee; Beit-el-Fakin, which, from the excellence of its harbour,[b] exports more of this article than any other place; Loheia, which also exports it in large quantity, though of an inferior kind; and Zebid, which is not the ancient *Sabotha*, but which enjoyed all the trade before the destruction of its harbour. The isle of Kamaran, fertile but unhealthy, contains, in a good state of preservation, a handsome aqueduct built by the Portuguese.

Having thus gone over the topography of Arabia, let us take a short and comprehensive view of its inhabitants. The Arabians are of a middling size, lean, and apparently dried up by the heat; an appearance no doubt arising in part from their abstemiousness, and the habit which they have of dispensing occasionally with liquids for a length of time. Their complexion is brown, their eyes dark, and their hair black; they are swift in running, and dexterous horsemen. They have the general character of bravery, of dexterity in handling the bow and the lance, and of being good marksmen since they have become familiar with the use of fire arms. Gravity of deportment, regarded among the people of the east as a mark of good breeding, seems less natural to the Arabians than it is to the Turks. Robbery is the open profession of many of those tribes which are called Bedouins. In the commercial towns, the art of cheating is employed as a substitute. These vices are supposed to be the offspring of the want of a regular government, but it may be hoped that other means of counteracting such dispositions may be in reserve, besides the presence of an extensive imperial authority in such forms as institutions of this kind have been hitherto known. The ancient patriarchal hospitality of this country still remains. A simple traveller, throwing himself on the protection of a respectable sheïk of the desert, may depend on the best reception. In certain villages of the Tehama, public houses are found, where travellers are lodged and fed without expense for some days. When the Arabians are at meals, any person who chances to come in is invited to eat with them, without any distinction of religion or of rank. It is said that, when a Bedouin sheik eats with a traveller, it is a sure pledge that he will give him his best protection. Sometimes a person who has just been robbed happens to enter the tent of the robber without knowing it; the latter tries to console him, by reminding him that God is merciful, and gives him a suit of clothes different from his own, while the other, in the mean time discovering the fact, still keeps up the appearance of ignorance. In politeness the Arabians emulate the Persians. They always kiss the hand of a superior as a token of respect.

Their houses, even when built of stone, are wholly destitute of taste. The men's apartments are in front; their jealousy, matured into a peculiar form of decency, places those of the women behind. Even the poor Bedouin divides his tent into two apartments by a curtain, behind which the women are concealed from the eye of indiscreet curiosity. The Arabian is sober in perfection. The common people have only one meal of bad bread, made of *doura*,[c] which exactly resembles thin barley cakes after they have been kept so long as to be perfectly dry, and as hard as stone. With this they take camel's milk, butter, grease, or vegetable oil. Pure water is their beverage; animal food is very little used; pork was proscribed among them long before the time of Mahomet.[d] At their meals they set small tables about a foot high on a large carpet laid on the ground or on mats, where the guests are seated. Like other Orientals, they are passionately fond of pastry. Their favourite liquor is coffee, which they prepare by burning in an open pan, and pounding in a stone or wooden mortar. This method is supposed to preserve a flavour which is lost by grinding it in a mill. The people of Yemen rarely use coffee, considering it as of a heating nature; but they prepare a liquor resembling tea from the coffee husks. Arabs of distinction make use of Chinese porcelain. Spirituous liquors, though forbidden by law, are not unknown in Arabia; a plant resembling hemp is often smoked, and is productive of a species of intoxication.[e]

The Arabians, like the Turks and Persians, are fond of long flowing garments. They also wear wide short tuckered trowsers, with an embroidered leather girdle over them, in which is stuck a shining poniard or dagger. They all wear the cloak called *habba;* it is a large double square piece of cloth, with a slit at the middle for the neck, and one on each side for the arms. The fabric of these mantles is of goats and camel's hair very closely woven. The proof to which they are subjected in buying, is to pour on them a pail of water, which they sometimes retain, without transmitting a single drop, for a quarter of an hour. The Arabians load their heads with a number of caps, which they encircle with several folds of a scarf. In general they wear nothing on the legs or feet, the soles of their feet being hardened by use to bear the heated sand without inconvenience. In the mountains, however, they use sheep skins as a protection to them. Some shave the head, others do not. The women of the lower orders wear nothing but a large shift and pantaloons. In the Hedjaz, as in Egypt, their eyes only are seen through the muslins with which their heads are covered; in Yemen they wear long veils. An Arabian female who was surprised naked by M. Niebuhr, covered her face with her hands, disregarding all other exposure. Arabian

[a] Edrisi, clim. I. p. 5. Ibn al Ouardi, edit. Hyland. part. 10. Notices et Extraits, II. p. 43. etc. [b] Hodeida.

[c] They give this name to a species of millet. *Malte-Brun.* The Doura is the *Holcus arundinaceus.* a species of Guinea-corn.—P.

[d] Mill, Dissert. de Mahomedismo, p. 25—118. Hieronym. in Jovinian. II. c. 6.

[e] Niebuhr, I. *passim.*

coquetry displays itself by showing off rings, bracelets, and necklaces of false pearls. Sometimes, like the women of Indostan, they wear rings in the nose in addition to the more common ornament of pendants to the ears. They use the juice of the *henné* to dye their nails red, and their feet and hands of a yellowish brown;[a] their eyelids are blackened with the native sulphuret of antimony. The practice of marking the skin with the figures of animals, flowers, or stars, which was in existence before the time of Mahomet,[b] has still left some traces among the Bedouin women.[c] The fashions of the east are subject to very little change. The dress of Esther, Sulamith, and other personages of the Old Testament, probably was on the same model with that which is seen on the women of rank of modern Arabia.[d]

The constraint to which the Arabian women are subjected does not altogether prevent intrigues. But the youth who is bold enough to trespass on the sanctuary of the harem finds his path encompassed with perils, battles, and death. The pastoral life of the Bedouins affords greater freedom to their women; and the desert is the general theatre of the keen passions depicted in the Arabian tales.[e] In the Song of Solomon, and various love songs and tales, the taste of the Arabian connoisseur in beauty is exhibited in the poetical portraits drawn of the favourite female. "Her form is tall and slender like the rush which bends before the wind, or like the lances of the men of Yemen. Voluminous at mid height from right to left, she enters with difficulty by the tent door. Two pomegranates swell the alabaster surface of her bosom. Her eyes are lively and tender like those of the antelope; her eye-brows arched; and her hair, black and curling, waves over a neck like the camel's."[f] The complexions of the lower orders of women in the maritime plains are a deep yellow; but in the mountains, even the females of the peasantry exhibit features, forms, and complexions, which Greece and Italy would not disclaim.

The ancient language of Arabia seems to have had a near resemblance to the Hebrew. Before Mahomet's time there were two leading dialects; that of the Hamyarites, or Homerites, which prevailed in Yemen; and that of the Koreishites, which was spoken in the country round Mecca. The latter was the least agreeable and pure of the two, but the promulgation of the Koran, and the victories of Mahomet, gave it a triumph over the other.[g] This sacred language is taught in the schools by fixed rules; in it alone the public instructions in the mosques are delivered. The present language of the learned, and which is also employed in solemn addresses, does not differ from it in construction, or in the application of its terms.[h] But a similar uniformity does not extend to the vulgar Arabic, which, like all languages that are widely diffused, has experienced many admixtures and alterations.[i] Not only do the people speak differently in the mountains of Yemen and the Tehama, but people of rank have a pronunciation difficult to imitate, and terms for various objects different from those of the peasantry; and all these dialects have but a slight conformity with that of the Bedouins. In the distant provinces the difference is still greater. It is by the junction of dialects so numerous, that the Arabic language boasts of so copious a vocabulary. In treatises on the subject, we are told that it has no less than a thousand terms for a camel, and five hundred for a lion. The pronunciation of the south and of the east is easier for the organs of the inhabitants of the south of Europe than that of the Arabs of Egypt and Syria. Our northern nations possessing a greater variety of consonants, especially of those called gutturals, are more capable of acquiring it. The conquests of the Arabians have disseminated their language along the southern shore of the Mediterranean, from Egypt to the straits of Gibraltar, and along the shore of the Indian Ocean to the island of Madagascar.

The most ancient characters used in Arabia seem to be those called the Persepolitan, formed of long lines, broad and split at one end, and brought to a point at the other, distinguished from one another chiefly by position and size, compared by some writers to nails, by others to arrows, and called the nail-headed or arrow-headed characters. These were succeeded by the Hamyaric, so called from a dynasty of that name; and these gave place to the Kufic or old Arabic characters.

The Arabic language is not so difficult of acquisition as its alleged multiplicity of terms and dialects might lead us to suppose. Among the other difficulties which are to be encountered in the mode of teaching languages generally employed, much waste of time arises from the attention of the pupil being first directed to the written or printed characters. If the sounds were represented, in the first instance, by judicious and well understood combinations of the elements of our own alphabet, and if a considerable advancement in the knowledge of words were made on that plan, all that is essential would be speedily acquired, and the use of the characters would be afterwards more easily studied, and with greater interest. The dialects have been represented by some as equally distinct from each other as the different languages of Europe are. But this is by no means the case. A native of Morocco or of Malta can converse without difficulty with Egyptians and Arabians. The Maltese servants who went with the British army in their expedition to Egypt, were very useful interpreters. The wide extent of countries in which this language is spoken and written, the works in history and science, and even in poetry and the belles lettres, which it contains, its affinity to the classical language of Persia, as well as to that of the Old Testament, and the light which is thrown by it on philology, general

[a] For an account of the henné, see a note of M. Langlès, Collection portat. des Voyages, II. 127.

[b] Moallakat, trad. de Hartmann, p. 69—125. Taraphae Moallakat, ed. Reiske, p. 45.

[c] Arvieux, Mémoires, edit. Labat. III. 297.

[d] Hartmann on the Toilette of the Hebrew Women, in German. Schrœder, devestitu mulierum Hebrœarum.

[e] Medjnoon and Leïla, Fr. translation of M. Chezy, pref. XXV. etc. etc.

[f] Passages from Hariri, Ibn Dorcid, Motannabi, and others, collected in Hartmann, Aufklärungen über Asien, I. 549, etc.

[g] Pococke, Specimen Historiæ Arabum, p. 150. Eichorn's Preface to the German translation of Richardson's Treatise on Oriental Literature. Adelung's Mithridates, I. 383, &c.

[h] Aryda, arch-priest of Tripoli in Syria, Memoir in answer to Niebuhr, in Arabic. See Jahn, Chrestomathie Arabe, p. 222, (Vienna, 1802.)

[i] Niebuhr, I. 118, &c.

grammar, and the genealogy of languages, furnish motives sufficient to make the acquisition of the Arabic language very desirable to every liberal scholar.

Although science in Arabia is reduced to some crude notions of medicine, and some of the reveries of astrology, the ardent genius of this people is exhibited and proved in the numerous poetical turns of thought which are contained in the Koran. Morality and poetry are still the favourite objects of their studies. The country of Djof, in the kingdom of Yemen, contains many persons who possess the talent of uttering extempore verses. Education, though it has declined in Arabia, is not altogether neglected. Many of the common people can both read and write. The higher classes keep teachers in their houses for the instruction of their children and young slaves. In general, every mosque has a school attached to it, and a revenue, arising from the donations of the charitable, is devoted to the maintenance of the teacher, and of poor scholars. The large towns contain many other schools to which the children of the middling classes are sent for reading, writing, and arithmetic. The girls are taught separately by female instructors. In some of the chief towns there are colleges for astronomy, astrology, philosophy, and medicine. The kingdom of Yemen has two famous universities or academies; one at Zebid for the Sunnites, and the other at Damar for the Zeidites. The xplanation of the Koran, and the history of Mahomet and the first caliphs, are the branches of study most generally attended to.

The extraordinary man who founded the Mahometan religion, had to contend with the ancient idolatry of the Arabians. In remote times human sacrifices were in use among them, as well as among their brethren the Syrians and Carthaginians. Sabeism, or the worship of the heavenly bodies, was common to them with the people of Syria and Chaldea. The Christian religion had made some progress in Arabia before the time of Mahomet. The country contained numerous tribes of Jews.[a] The Arabian prophet had some difficulty in reducing them. His church, like every other, is divided into parties maintaining contradictory opinions. Besides the sect of the Sunnites, there is another very considerable one, which goes by the name of the Zeidites. In doctrine they seem to agree with the former, but are less rigid in their religious observances. Towards the middle of the last century, a sheik of Yemen[b] formed a new sect about the same time that the religion of the Wahabees sprung up in the centre of Nedjed. The Shiites, or the sect of Ali, prevail along the Persian Gulph. In Omân another sect has arisen, rather of a political than a religious nature: its adherents are called Bejas, and they do not acknowledge any of those great prerogatives which the descendants of Mahomet exercise, particularly in the province of Hedjaz.

Having already given some view of the arts and commerce, as existing in Yemen and Omân, we subjoin a few general remarks. The arts are neglected in Arabia. There is no printing press in the country. The chief obstacle to this art is, that the modern Arabic letters being mutually connected and often placed above one another or interlaced, are thought more handsome when well written than when printed. Hence, printed works are so offensive to the eye that no person will read them. This obstacle, however, we may expect to see removed by the use of that elegant recently discovered art called the lithographic, by means of which written characters continuous without interstices, are impressed with a saving of labour equally great, if not greater, than that attending typography, as compared with that of multiplying copies with the pen. As the zealous Sunnites allow of no figures of objects, painting and sculpture are arts unknown in Arabia; but their inscriptions in relief are well executed. Gold and silver are very well worked in Yemen. But this art is chiefly carried on by Jews and Banians. Even the money is coined, at Sana, by the former. Clock and watch-making are neither much advanced nor greatly esteemed. Music is also neglected, at least no instruments except drums and fifes are used. All mechanics work in a sitting posture. There are some sorts of employments in which the Arabians use their toes with the same dexterity as we do our fingers. No wind mills or water mills are found in Arabia, but Niebuhr having seen in the Tehama an oil press which was turned by an ox, thought it probable that corn mills of the same description were also used.

Arabia probably contains a population of ten or twelve millions, who, united under one political head, might prove a formidable enemy to Persia, Turkey, or the whole of Africa.

[a] See the passages collected in Schultens, Historia Joctanidarum, p. 61, 62—144.

[b] Mékrami.

Table of the Geographical Positions of Arabia.

Names of places.	Lat. N.	Long. E. of London.	Authorities.
	deg. min. sec.	*deg. min. sec.*	
Tor (in Arabia Petræa)	. . . .	33 33 10	Unpublished Travels, Connaissance des Tems.
Idem	28 12 19	. . . .	Niebuhr, in Zach's Corresp.
Raz Abou Mohammed	27 50 0	. . . .	Unpublished Travels, Connaiss. des Tems.
Kalaat-el-Moïlah . .	27 28 0	. . . .	Idem
El Hamman Firann .	. . . .	33 3 40	Idem.
Jemboa	24 7 6	37 32 30	Idem.
Idem	24 5 0	. . . .	Niebuhr, in Zach's Corresp.
Ras-Abiad	23 30 0	. . . .	Unpublished Travels, Connaiss. des Tems.
Arabog	22 33 0	38 52 0	Idem.
Gedda or Djidda . .	21 32 42	39 6 0	Idem.
Idem	21 28 23	39 25 0	Niebuhr, by lunar distances, Zach's Corresp. VI. p. 166.
Mecca	21 28 9	40 15 0	Unpublished Travels, Connaiss. des Tems.
Ghumfude	19 7 0	41 42 0	Niebuhr, in Zach's Corresp.
Loheia	15 42 8	42 8 45	Niebuhr, calculated by Father Hell.[c]
Beit-el-Fakih . . .	14 31 17	. . . .	Idem, Zach's Corresp.
Zebid	14 12 0	. . .	Idem.
Taais	13 34 7	. . . .	Idem.
Sana, capital of Yemen	15 21 6	. . . .	Idem.
Moka	13 18 41	. . . .	Idem.
Idem	13 16 0	43 10 15	Connaiss. des Tems.
Island of Perim in the strait of Bab-el-mandeb	12 38 0	. . . .	Niebuhr.

N. B. As the ancient and modern political divisions offer nothing certain, and are in a great measure unknown, no comparative Table is given.

[c] From several observations of the satellites of Jupiter; but in Zach's Corresp. VII. p. 69, Niebuhr has given observations of lunar distances, which seem to give a different result.

BOOK XXXI.

PERSIA.

Its general Physical Geography.

The leading division of Persia, in modern times, is into two monarchies; that of the Afghans on the east, and that of Futté-Ali-Shah on the west. Therefore, though these political divisions are liable to continual change, we shall assign separate portions of our work to these two parts, entitling the latter Afghanistan. Persia, however, being the most conspicuous, as well as the most ancient in a political point of view, and having included, at different times, and for long periods, the territory at present in the hands of the Afghans, some of our general descriptions under the head of Persia will extend beyond the limits of the modern Persia, especially towards the east, where indeed the boundaries are in some degree uncertain. The range of country comprehended in these two monarchies, reaching from the basin of the Tigris and Euphrates on one side, to those of the Sinde or Indus, and of the Oxus or Gihon, on the other, forms a great natural region washed by the Caspian sea on the one side, and on the other by the Persian gulph and the Indian ocean; and though this vast plateau is greatly diversified, and comprehends several distinct basins, there are still so many points of resemblance among them as to form one whole.

The political revolutions to which this country has constantly been a prey have most frequently ended in a union of it under one sceptre. In the earliest dawn of history, we find it possessed by several independent nations: the Persians in the south, the Arians in the east, and the Medes in the centre; different barbarian hordes, as the Hyrcanians, Parthians, and Cadusians, on the north. It is a matter of doubt whether the ancient empires of Nineveh and Babylon ever included ancient Persia, that is, the present *Fars*, with Kerman and Laristan. History hangs in suspense about the truth of the marvellous expeditions of Semiramis; but we know that every momentary inroad figures as a conquest in the chaos of primitive history. The Medes, however, really subjugated the Persians. That people seem to have first carried their arms against the Scythians of Asia, in Turan or the present Tartary, and against the Indians. Five centuries and a half before the Christian era, Cyrus delivered his nation from the yoke, and gave it the sovereignty over the whole of western Asia. But on entering Europe, the little nation of the Greeks arrested the progress of the numberless armies of Asia. Soon after, united under Alexander, they overthrew the feeble colossus of the Persian power. After his death, when the discord of the victors gave rise to a multitude of separate kingdoms, the warlike tribe of the Parthians, about the year 248 before Christ, took possession of the provinces which form the modern Persia. The Greeks still maintained their ground in Bactriana. Demetrius, their king, subjugated and civilized Indostan. Eucratides the first reigned over a thousand cities. But the Scythians, or rather the new nations which succeeded to the Scythians, uniting with the Parthians, overthrew the Bactrian throne. The Parthians, under their kings of the Ashkanian dynasty, the Arsacides of the Greek historians, successfully resisted the progress of the Roman power. About the year 220 of the Christian era, a private man among the Persians, according to the Greek authorities, wrested the power out of the hands of the Parthians, and founded the dynasty of the Sassanides. But the oriental writers do not consider the modern Persians as distinct from the Parthians; and, according to them, Artaxerxes, or Ardshir, the first of the Sassanides, was descended from the royal blood of the Parthians. Whatever be the fact on this dark point, the Persian empire often struggled against that of Constantinople; and having made a brilliant appearance under the sway of the wise Nooshervan, submitted to the Arabians, and to the Mahometan religion, about the year 636.

Two centuries after this the kingdom of Persia was re-established in Khorasan; and, after several revolutions, recovered its original extent of territory. In the year 934 the house of Bouiah ascended the throne, Shiraz being the seat of government. Persia was included in the conquests of Gengis-Khan in 1220, and Tamerlane in 1392, and recovered its freedom again under the Sophis, who ascended the throne in 1506. Shah-Abbas, surnamed the Great, began in 1586 a reign of nearly half a century, which was brilliant but tyrannical. In 1722 Persia was conquered by the Afghans. This event was followed in 1736 by the extinction of the family of the Sophis, and the elevation of Nadir, surnamed Thamas-Khouli-Khan, to the imperial throne. This ferocious, but able and fortunate prince, was a native of Khorasan. On the 20th of June, 1747, he was killed, after a reign of eleven years, which was chiefly signalised by the rapid conquest of Indostan.

This was the commencement of a period entirely new, by which the modern geographical division of the country was fixed. The weakness of Nadir-Shah's successors, and the dreadful war which devastated western Persia, gave to the Afghans an opportunity of consolidating a new empire, which embraced the whole of eastern Persia, and of which the city of Kaubul is the capital.

Western Persia enjoyed some repose under the government of Kerim-Khan, who did not assume the title of Shah, contenting himself with that of *vekil* or regent. This good prince had served under Nadir, with whom he was a particular favourite. When the tyrant died he was at Shiraz. He took on him the reins of government, and was supported by the inhabitants of that city,

who were charmed by his beneficence, and placed unbounded confidence in his justice. In return for this attachment, Kerim embellished their city with beautiful palaces, mosques, and elegant gardens; he repaired the high roads, and rebuilt the caravanseras. His reign was not soiled by any act of cruelty. His charity to the poor, and the efforts which he made for the re-establishment of trade, met with universal praise. He died about the year 1779, after a reign of sixteen years.

The death of Kerim was followed by new disturbances and misfortunes, as his brothers attempted to take possession of the sovereignty to the exclusion of his children. At last, in 1784, Ali-Murat, a prince of the blood, obtained peaceable possession of the throne of Persia. In the meantime, a eunuch of the name of Aga-Mohammed took independent possession of Mazanderân. Ali-Murat, in marching against this usurper, was killed by a fall from his horse. His son Jaafar succeeded to the sceptre, but he was defeated by Aga-Mohammed at Yezde-Kast, and withdrew to Shiraz.

In 1792, Aga-Mohammed attacked that city, and Jaafar lost his life in an insurrection. The victor defaced the tomb of Kerim, and insulted his ashes. The heroic valour of Louthf-Ali,[a] son of Jaafar, was opposed in several desperate engagements to the fortunes of the eunuch, but without success, and the latter became final master of the whole of western Persia. He named as his successor his nephew, Baba-Khan, who, since 1796, has reigned peaceably under the name of Futté-Ali-Shah. This prince has been engaged in several wars against the Russians, and, that he might the more advantageously defend the northern provinces from that power, he established his residence at Tehrân. The provinces which in 1810 were subject to him, were Erivan, Adjerbidjan, Ghilan, Mazanderân, western Khorazan, Irak-Adjemi, Persian Koordistân, Farsistân, and Kermân. The Arabian sheiks on the Persian Gulph were tributary to him, and respectful presents were sent to him by the *wali* or prince of Mekrân [b]

Such was of late the state of Persia, that it had ceased to be customary to crown the sovereigns. The anarchy was so habitual, that the only recognizance of majesty was to proclaim every morning the name of the khan who reigned for the day. But Futté-Ali bears the dignified title of Shah or king. This prince, firm and severe, appears to have delivered the people and the government from the arbitrary authority and the exactions of numerous khans. The title of khan, derived from the Tartars, corresponds to the denomination of *mirza* among the Persians, which is now given to gentlemen in general. The khans are sometimes governors of provinces, sometimes only proprietors of small districts, and claim a hereditary right of succession, although the sovereign has it in his power to punish them with confiscation or with death. The great khans are sometimes called *beglerbegs*, and in time of war *sirdars* or generals. Those who have the command of towns are generally denominated *darogas* or governors.

Futté-Ali-Shah can bring into the field more than 100,000 men, and the number of his subjects, though greatly reduced by recent wars, is probably from six to eight millions. The kingdom of Kaubul, with its Indian provinces, possesses perhaps an equal population, but its strengh is greatly impaired by intestine anarchy. On the whole, notwithstanding the bravery of the Afghan infantry, and of the Persian cavalry, these two empires, in a state of separation, can never enjoy a high political importance.

We now proceed to our description of the country, to which the preceding historical preamble was necessary. Western Persia is bounded on the north by Georgia and the Caspian Sea, both in possession of Russia. Shirwan, though partly occupied by the Russians, has not yet been formally ceded to them by Persia, nor has she even formally acknowledged the right which the Georgians have exercised in submitting to the Russian authority. The Turkish frontier has not been altered since Ali-Murat gave up the city of Bassora to the Turks. The Persian Gulph, already described in our account of Arabia, forms the southern boundary of this country; but the Persians, though situated between two seas, have never cultivated navigation.

The whole of Persia is a highly elevated country, as is proved by the great abundance of snow. This plateau joins that of Armenia and Asia Minor on the west, and becomes confounded with that of central Asia on the east. This is the chain of high lands which the ancients called Taurus, a general term which they applied to any thing gigantic. Taurus divided Asia into two, or rather, according to Strabo, into three parts. The first lies on the north of the mountains. The second is on the top of the Taurus, lying between the different chains of mountains of which it consists, and the third is that which is situated to the south. This mode of division is founded on an accurate observation of the leading differences of climate and of produce. But the ancients knew that the numerous chains of mountains comprehended under the general name of Taurus were "divided by many vallies and elevated plains."[c] They also knew that many of the mountains of Persia, after rising abruptly from the middle of the plain, suddenly became flat at the summit, and presented an absolute plain.[d] These observations are confirmed by modern travellers. The mountains of Persia, according to M. Olivier, do not seem to form any continued chain, nor to have any leading direction. They extend without order in all directions, and are heaped one on another as if thrown together at random. Groups which seem to form the commencement of chains, are suddenly interrupted by smooth, extensive, and very elevated plains.[e] But the plateau itself on which this mass of mountains is reared, must have two declivities, one towards the Euphrates and the Persian Gulph, and the other towards the Caspian Sea. These are the two branches of Taurus, spoken of by the ancients.

It is on the south side of the basin of the river Kur, that we must look for the northern continuation of Mount Taurus. Ararat, and the chain to which it belongs, join the high mountains which separate the lake Van from the lake Oormia. These last are a part of

[a] Or, Looft-Ali.
[b] Histoire des Revolutions de Perse, par Picault, 3 vol. 1810. Voyage de Chardin, Notice Historique de Langlès, dans le 10e volume.
[c] Strabo, lib. XI. p. 358, etc.
[d] Curt. lib. VI. cap. 16. lib. VII. cap. 39.
[e] Olivier, Voyage dans l'empire Ottoman, la Perse, etc. V. chap. 7.

the *Niphates* of the ancients. But to the south of the river Araxes, there is a chain of very cold mountains, the south side of which embraces Adjerbidjan, the ancient *Atropatene*. These mountains defied the arms of Alexander the Great; from their sides the Alpons go off towards the east, a belt of high limestone mountains which runs parallel to the southern shore of the Caspian Sea. In the ancient Hyrcania, the sides of these mountains are described as not only steep towards the sea, but projecting "in such a manner, that the rivers threw themselves into the sea, forming a liquid arch, under which men could pass on dry ground."[a]

The "Caspian Gates," passing through this range, are mentioned by the ancients as an artificial road, twenty-eight Roman miles in length, of a width which admitted only a single chariot to pass, with high black rocks on each side, from which salt water continually trickled down, rendering the road very troublesome, while it was also infested by numerous serpents, rendering it impassable in summer.[b] This passage is near Demawend, at a distance of forty miles[c] from Tehrân.[d] According to the ancients, these Hyrcanian mountains were continued to Bactriana, where they joined those called the *Paropamisan*, the *Gaoor* of the moderns. Mr. Forster, in his travels, says, he found no mountains between Kandahar and Herat. This only shows that the traveller went along a plateau, and neglected to extend his researches. This gentleman himself, at the same time, adds weight to our opinion, when he says, that there is a high chain of snowy mountains to the north of Tchershitz. These are the mountains of the ancient Parthiene. Mr. Forster travelled along the basin of th Furra Rood, and the Helmund, with its tributaries, and had on his right the mountains of Paropamisus, which are extensive in all dimensions, and occupied by the Eimaks, Hazaurehs, and Dooranees.[e]

The southern chain enters Persia to the south of the lake Oormia. The branch of Aiagha-Tag, which goes off to the south, and forms the boundaries of the kingdom, is the *Zagros* of the ancients, and always in the possession of the Koords. The first great chain which enters Persia is called Elwend. The Persian geographer, Ebn Haukal, informs us, that from the neighbourhood of Koordistan to Ispahan, the country consists entirely of mountains. He specifies, among the most noted, the Demavend, from the top of which the eye takes in a range of 200 miles,[f] while that of Bisootoon, in the same country, was celebrated for its singular sculptures, which are still in existence. The Hetzerdara, or 1000 mountains, embrace on the north and west the basin in which the city of Shiraz and the ruins of Persepolis are situated. This chain required the utmost exertion for the army of Alexander to penetrate it. The passage called the Gates of Susa, or of Persis, was occupied by a body of Persian troops.[g] Another defile led from Persia into Media, called Climax Megale, or the great stair, because the passage was cut out in the form of steps.[h] On the south the mountains are not far from the Persian Gulph; they traverse Kermân or Carmania, and though one of their branches appears to lose itself in the desert to the east of the lake Baktegan, the principal chain seems to join that which separates Seïstân, or the ancient *Drangiana*, from Mekrân, or the ancient *Gedrosia*. A modern author calls them *Djebel-Abad*. This chain joins the Sooliman mountains, which, with the mountains of Wulli, form a long plateau, separating Persia from India. This plateau, abounding in hills, possesses great elevation even in its valleys, as may be inferred from its temperature. It joins the great plateau of central Asia.

On the whole, it must be acknowledged that, though in this outline of the mountains situated between the Caspian Sea and the Indian Ocean,[i] we have thought proper to pay the utmost respect to the descriptions of the ancients, particularly of Strabo, new local observations are requisite before this part of physical geography can be properly understood. The Persian mountains, separately taken, appear of moderate height, yet, being covered with snow for a great part of the year, they must be considered as resting on a very elevated base.[k]

One of the distinctive characters of the plateau of Persia is its great extent of deserts, which are rather saline than sandy. They are principally five. The most distant is that of Karakum on the north of Khorasan, which is sandy. That which lies between Khorasan and Irak-Adjemi, called the Great Salt Desert, is 360 miles long, and 190 broad,[l] and appears to join that which forms the northern part of the province of Kermân, the *Carmania Deserta* of the ancients; these, along with the deserts of Kiab and of Mekran, occupy three-tenths of the country. In the Great Salt Desert the layer of crystallized sea salt which covers the surface of the ground, is in several places an inch in thickness. According to Beauchamp, it is in this desert, not far from Kom, that the enchanted mountain Telésmé is found, from which the word talisman is derived. This arid and steep mountain appears to alter its form according to the points from which it is seen. The black moving sand with which it is covered contributes to multiply these illusory appearances. A small stream flows past it, the water of which is remarkably heavy and saline.[m]

The Persian deserts, so similar in other particulars to those of Africa, present also the same kind of lakes, but of larger size. There are more than thirty which have no outlet. That of Zereh, or Durra, covers an extent of 1100 square miles,[n] and receives the river Hindmend, or Helmund, which is upwards of 400 miles in length.[o] This lake is the *Aria Palus* of the ancients. But it belongs more properly to eastern Persia or Afghanistan. Lake Bakteghan is another lake without any outlet. Its

[a] Strabo, lib. XI. p. 551.
[b] Pliny, lib. VI. cap. 14.
[c] "10 farsangs."
[d] The author here refers to a MS. by M. T———.
[e] Forster's Travels from Bengal to Petersburgh. See the Map accompanying Mr. Elphinston's account of Caubul. Also Book XXXV. of this work.
[f] "50 farsangs, or 72 French leagues."
[g] Arrian, lib. III. cap. 18. Diod. lib. XVII. chap. 68. Strabo, lib. XV. p 501
[h] Plin. lib. VI. cap. 26.
[i] "Persarum regna, inter duo maria, Hyrcanum et Persicum, attolluntur jugis Caucasiis, utrinque per devexa laterum." Plin. lib. VI. cap. 13.
[k] Beauchamp, Journal des Sçavans, 1790, p. 730.
[l] "130 Fr. leagues long, 70 broad."
[m] Beauchamp, Journal des Sçavans, 1790, p. 734.
[n] "140 sq. Fr. leagues."
[o] "150 Fr leagues."

waters are salt, although it receives a great number of fresh water rivers, among others the Bendamir or Araxes, and the Kuren or Cyrus.

Among the high mountains of Adjerbidjan and of Armenia, is the great lake of Urmia, or Ooroomia, so called from the name of a town situated at its southern extremity. This lake is represented as about 47 miles[a] long, and half as broad. This lake must be the *Spauta* of Strabo, and the Capoton of the Armenian geography, at least if d'Anville is correct in making the Van lake, which is a short way to the west, the *Arsissa* of antiquity. This lake is very saline, and yields a bitter salt when evaporated, and one third more in quantity than that obtained from the waters of the sea.[b] When the rivers which supply it are much swollen, the surface of this lake sometimes rises thirty feet. From the strata of shells found on the south and north, it seems to have formerly extended further in these directions.[c] It contains no fish. The limestone mountains in its neighbourhood are remarkable as being the country of the famous Assassins. Lake Erivan, about one hundred miles to the north of it, is about seventy miles[d] in circumference. It has a small island in the middle, and abounds in carp and trout. It is the *Lychnites* of Ptolemy.

The Euphrates and the Tigris cannot now be numbered among the rivers of Persia. Such others as run into the Persian Gulph are small, and require no observation. The rivers of Mekrân, or the ancient Gedrosia, are little known by the moderns. It appears from the ancients, that notwithstanding the apparent length of the Mend or Kurenk and the Nehenk, they are only torrents which are dry during summer, or which are lost in the plains of moving sand with which the coast is bordered. Alexander procured water there by digging cisterns; and it is now found only at great intervals. This coast, according to Strabo, closely resembles the Tehama of Arabia; its rivers are full only in the rainy season.[e] The central plateau of Persia gives origin to many rivers which do not reach the sea, but are lost in the sands, or in lakes without any outlet. The Bend-Emir, celebrated for its verdant and shady shores, falls into lake Bakteghan, whatever certain travellers may have said to the contrary.[f] The largest river of Khorazan, the Tedzen of the moderns, and the Ochus of the ancients, loses itself in a marshy lake, according to Wahl, but it is more probable that it passes through the marshes which it forms to communicate with the Gulph of Balkan. Among the other Persian rivers which fall into the Caspian Sea, there is only one of considerable length, the Kizil-Ozen, as the inhabitants of the country call it in the Turcoman language, the Sefydrood of the Persians, and the *Mardus* of the ancients. Its waters flow in a series of cataracts, through picturesque ravines, and at its mouth it runs with great force into the sea, the surface of which is affected by it a considerable way from the shore.[g]

The soil of the plains is generally a strong clay. The mountains have not been examined; but they seem to consist chiefly of limestone, an observation which is confirmed by the numerous caverns mentioned by the ancients. A French traveller has recently crossed in two places the great chain of Alpons, by which Ghilân and Mazanderân are encompassed, and in which the peak of Demavend rises to a height of 8000 feet[h] above the plains of Tehrân, which are at least 3200[i] above the level of the Caspian. All the rocks which he saw consisted of limestone, marble, and alabaster, with numerous blocks of granite lying scattered in different places. The reefs which border the coast of Mazanderân are of granite.[k]

Modern travellers have observed in the westernmost chain, or the Zagrus, a series of rocks of sandstone, limestone, and granite, succeeding one another in the same manner as they generally do in our mountains in Europe.[l] From the description of Tournefort, we are led to believe that Ararat and the neighbouring chains contain a large quantity of slate.[m] It is probable that a country of such extent will present to future observers all sorts of rocks, soils, and geological appearances. If Chardin's account is true, the internal structure of the country is laid open on the surface, the mountains being the most arid and sterile in the world, consisting of dry rocks, without wood or any herbaceous plants.[n]

The last-mentioned traveller infers from the vast extent of the country, that it is very little subject to earthquakes. If this be the case, Ghilan and Mazanderan must be excepted, being liable to shocks of this kind, both violent and frequent;[o] also, the country round Tabriz, which experienced, in 1721, one of the most dreadful disasters of this kind that are mentioned in history;[p] the mountains of Irak-Adjemi, among which the Elboors is not the only volcano;[q] and finally, the southernmost chains of Farsistan and Laristan, where recent examples of earthquakes have occurred.[r]

"My father's empire," said the younger Cyrus to Xenophon, "is so large, that people perish with cold at the one extremity, while they are suffocated with heat at the other." This description still applies to Persia. It has three leading distinctions of climate. The shores of the Caspian sea being about sixty feet lower than those of the ocean, experience in summer stronger and more lasting heats than those of the West Indies.[s] The winter in that quarter is very mild, from the temperate winds which come from the surface of the Caspian. But in both seasons an excessive humidity prevails. Steel speedily rusts, and the inhabitants have a feverish paleness of complexion. The central plateau presents the second climate. Surrounded with mountains, on many of which the snow lies the whole year, this region, from

[a] "17 Fr. leagues."
[b] Strabo, lib. XI. p. 350.
[c] M. Fabvier, Journal in MS.
[d] "25 Fr. leagues."
[e] Strabo, lib. XV. p. 496.
[f] Herbelot, Biblioth. Orient. au mot Adhad-Edoulet. Compare Chardin, Figueroa, Herbert, &c.
[g] Olearius, p. 472, original ed. Hanway, Gmelin, &c.
[h] "1200 to 1300 toises."
[i] "500 toises."
[k] M. Trezel, Voyage dans le Ghilan, MS.
[l] Olivier, V. p. 8, 9, 202.
[m] Schiste cornéen, Wahl, I. 909.
[n] Chardin, III. 288, &c.
[o] Lerch, Magasin Géogr. de Busching, III. 8-38. Herbert, Voyage p. 208.
[p] Wahl. I. 937.
[q] Olivier, V. 126.
[r] Niebuhr's Travels, II. 169, (in German.)
[s] Olivier, V. 223.

Kandahar to Ispahan, experiences by turns excessively hot summers, and equally rigorous winters. From March till May strong winds are frequent; but from May till September the air is serene, and refreshed by a night breeze. Some have represented the clearness of the sky in the night to be such, that a book might be read by star-light. From September to November high winds again prevail; the air is extremely dry; thunder and lightning are rare; a rainbow is seldom seen; but in the spring the vegetation suffers much from hail. This general character of the climate is subject to local modifications; Farsistan, particularly, in the valley of Shiraz, is exempt both from excessive heats and rigorous cold; and the mountains of Koordistan and Adjerbidjan derive from their elevation and their forests a more humid atmosphere and a more equal temperature.

Here, however, the winters are described as sometimes extremely rigorous. Travellers are often caught in snow storms, in which they inevitably perish. Many instances have occurred, in which not only solitary individuals, but whole companies and caravans, have been overwhelmed. Sir Robert Ker Porter, while describing these scenes, mentions two circumstances relative to the dispositions of the inhabitants, which we shall take the opportunity of stating in their present connexion; both being strange instances of inattention to the precautions dictated by personal feeling and common prudence, as well as humanity. The one is, that few of them of either sex put on additional clothing, though many of them, both old and young, go with the breast entirely bare; a neglect which, in some measure, accounts for the most melancholy catastrophes, in consequence of an accidental exposure under a degree of frost from which a Cossack, covered with his cloak or boorka, or a Russian under his shaab, would hardly feel inconvenience. Scarcely a day passes in winter without one or two persons being found frozen to death in the neighbourhood of the towns. The other circumstance is, the rigid execution of the general regulation about the closing of the gates, to the loss of numerous lives. The gates of all towns and cities of Persia are shut a little after sunset, and re-opened at sunrise; and many who, from carelessness or unavoidable delay, arrive later at the gate, perish in the cold of the night. Hence, during the inclement season, in the north-west provinces, a terrible scene of death often unfolds itself close to the threshold at the opening of the gates; old and young, children and animals, lying in one lifeless heap.

The face of nature suffers a complete change as we descend from the central plateau to the shores of the Persian Gulph. Here the samiel or burning wind sometimes destroys the imprudent traveller. Strabo tells us that the inhabitants of Susa durst not go from home in the middle of the day, and that those who were rash enough to expose themselves to the violent heats often fell down dead in the street.[a] In Gedrosia, or Mekran, the heats are nearly as violent as in India; tropical rains inundate the parched hills during the rest of the year.

The vegetation of Mekran is very similar to that of India. We find there the palms of Indostan and the odoriferous shrubs of Arabia Felix. The soldiers of Alexander fed on dates and the cabbage palm; they strewed their beds with nard, and built their huts of a species of frankincense tree; their horses were poisoned by eating a kind of laurel, probably the *laurus indica*;[b] the crops of wheat were poor and uncertain. On approaching the sea, an arid coast presented nothing but palms, tamarisks, and thorny shrubs, without water or provisions. But Carmania, or Kermân, abounds in every kind of fruit but the olive. Its grapes are very large. Cotton and the sugar-cane are cultivated along the Persian Gulph. In the time of Pliny, cotton grew spontaneously on the islands. Mangroves appear, according to the same author, to have bordered the shores of the sea.[c]

In western Persia, or the present Persian kingdom, three regions are deserving of notice; the southern mountains, the plateau, and the northern mountains. Although Farsistan, or Persia properly so called, seems to have lost the forests with which all its mountains were formerly covered, there are still in the valley of Shiraz delightful walks, shadowed by oriental planes, medlar trees, weeping willows, and poplars of extraordinary size.[d] In the midst of these fine trees many plants remarkable for beauty and for fragrance are lavished by the hand of nature: such as blue and scarlet anemonies, jessamines, hypericums, tulips, and ranunculuses. Olivier gathered in that country several plants formerly unknown to the botanist. He found on the Elboors the *Chrysanthemum prœaltum*, and the *Nepeta longiflora*. One plant, then new, is since called, from his name, *Oliveria decumbens*. It is of the umbellate order, and smells like thyme.

The elevated plains of central Persia are covered with those species which affect a saline soil; among which is the *Statice Tartarica*. But some of the open plains, not yet inundated by sand, still present fertile pastures, where, in former times, the horses fed which were appropriated to draw the chariot of the great king.

Towards the shores of the Caspian Sea we find a greater vigour in the growth of the forests. The long lying of the snow, and a very protracted spring, are favourable to vegetation. The atmosphere, warm and moist, permits the sugar-cane to grow, and even to produce tolerable sugar. Travellers forcing their way by climbing through thickets of sweet briars and honeysuckles, on the varied and picturesque sides of the hills, find themselves surrounded with acacias, oaks, lindens, and chesnut trees. Above they see the summits crowned with cedars, cypresses, and pines of various descriptions.[e] The sumach, so useful from its astringent virtue in the arts of dyeing and tanning, grows there in abundance. The flowering or manna-ash, (*Fraxinus ornus*,) is equally common. Ghilan abounds so much in boxwood, that camels cannot be employed in that country. The leaves of this tree are poisonous to that animal, and it has no instinct leading it to avoid them. An ancient observer, Aristobulus, quoted by Strabo, states, that the ancient Hyrcania, on the south-east side

[a] Strabo, lib. XV. p. 503.
[b] Strabo, lib. XV. p. 495. (The text is very corrupt in this place.)
[c] Pliny, lib. XII. cap. 9, and lib. XIII. cap. 25.
[d] Franklin's Travels in Persia. See Langles' Pocket Collection of Travels.
[e] Olivier, Voyage, V. p. 217, *sqq.*

of the Caspian Sea, though rich in oaks and many other trees, produced no pines.[a]

But Persia, whose varied soil affords so much pleasure to the botanist and the painter, has but a small extent of arable land. In the central and southern provinces a hard dry clay succeeds to barren rocks. This soil requires artificial irrigations. Unfortunately the canals subservient to this purpose have been destroyed in the frequent civil wars, in order to cut off the supply of water from an enemy. Scarcely a twentieth part of the country is at this day in cultivation. The most common grain in Persia is wheat, the quality of which is excellent. Rice, however, is regarded by the inhabitants as the most delicious food. It grows mostly in the north, where the provinces are well watered. Barley and millet are also sown, but oats very rarely. The Armenians sow a little rye. The ploughs, small, and drawn by lean oxen, merely scratch the surface. The hopes of the farmer are in some seasons sadly disappointed, and general famine produced by the want of rain. This was the case in the summer of the year 1781 in the province of Irak-Adjemi, and the neighbourhood. The inhabitants then suffered under the consequences of two successive years of this description. Dogs, cats, mules and horses were devoured by the starving natives. An unhappy pair at Kashan killed two of their female infants for food; several similar instances occurred. Thousands, in attempting to fly to other places where the famine might be less severe, became exhausted by the way, so that the roads were covered with the dying and the dead. Such scenes were alleviated, but not prevented, by distinguished acts of munificence which were extended on that occasion to the people by the governor and prince Abbas Mirza.[b] Agriculture is in some instances hampered by certain impolitic regulations. Land under lease from the crown pays rent according to its produce. Sentinels are placed on the ground not merely to preserve the harvest from the depredations of strangers, but more particularly to prevent the tenant from stealing his own property, a manœuvre sometimes adopted to lessen the payment of rent by offering an excuse of a robbery having been committed on the produce.[c] This regulation must discourage the expenditure of capital and labour in agricultural improvements.

Persia is in some measure consoled for these disadvantages by the excellence of its fruits. There are twenty sorts of melons; the finest grow in Khorasan. In Persia this fruit is extremely succulent, and contributes greatly to health. They are sometimes so large that two or three are a full load for a man. The most esteemed fruits of Europe are believed to have been brought originally from Persia, as the fig, the pomegranate, the mulberry, the almond, the peach, and the apricot. The oranges are of enormous size, and are found in places sheltered by the mountains. The heat reflected from the sand is particularly favourable to the cultivation of the lemon. The vine here displays all its riches, but it is only cultivated by the Guebres or worshippers of fire. There are among other kinds of wine three particularly excellent. That of Shiraz, reputed to be the best, is kept for the use of the sovereign and the grandees of the court. That of Yezd is very delicate, and is transported to Laar and Ormus. That of Ispahan is distinguished for its delicious sweetness.[d]

Among the vegetable tribes that are useful in the arts, Persia produces linen, hemp, tobacco, sesamum, which gives an oil, cotton, saffron, turpentine, mastic, various gums, and gall nuts. Mazanderân is the only province from which olive oil is obtained, although the wild olive grows in all moist situations. Strabo informs us that the attempts made to introduce the olive into Media were unsuccessful.

It is said that Persia produces annually 20,000 balls of silk, each weighing 216 lbs. Only about 1000 of these are used in the country. The rest is sold in Turkey, India, and Russia. Opium, manna, and rhubarb, are among the exports. The opium poppy, or *Papaver somniferum*, is cultivated in large quantities.

The Persian soldiers use Tartar horses, on one of which Kherim-Khan once travelled 332 miles[e] in fifty-eight hours; more than five miles per hour, in one uninterrupted journey. The horses of Persia are esteemed the finest and handsomest of any in the east, although in fleetness inferior to the Arabian. They are higher than those of England, with a small head, delicate limbs, and a well proportioned body. They are gentle, hard working, lively, and swift. The mules are greatly in request. The ass resembles that of Europe, but an excellent breed has been introduced from Arabia. It is neat, vivacious, and docile, with soft hair, carrying the head high. The camel is very common. The horned cattle are similar to those of Europe. The sheep drag behind them a tail of 30 lbs. weight, which is flat and heart-shaped, becoming widest at the extremity. This appendage is formed of fat, and affords good eating. Numerous flocks of them are maintained on the pastures of Erivan. Swine are but seldom seen in Persia, being proscribed both among Jews and Mahometans, though recommended for the salubrity of their flesh by Hippocrates.

Some of the forests contain deer and antelopes. Hares breed in great numbers in the uncultivated lands. In the forests, the wild boar, the bear, the lion, and, according to some, the smaller kind of tiger, lurk. According to M. Olivier, there is in the neighbourhood of the Euphrates, a species of lion without a mane, which was known to the ancients. It is undoubtedly to this gentle creature that the accounts of historians refer, when they tell us, that the Persians had long been in the practice of taming animals of prey, so as even to hunt with lions, tigers, leopards, panthers, and ounces. Lucretius says that the Parthians had attempted, without success, to employ lions along with their armies against the enemy.

The Caspian cat, (the *Felix chaus* of Gmelin,) the Aha, or *Cervus Pygargus*, and other animals, live in the

[a] Strabo, lib. XI. p. 351.
[b] Porter's Travels, &c. vol. I p. 386. Ibidem, p. 381.
[c] Olivier, V. 281, &c. Chardin, VIII. 158. III. 337, and a note by Langlès.
[d] "120 Fr. leagues."

deserts and the forests adjoining the Caspian Sea. There is a distinct species of squirrel, called the Persian. The Persian boar is an animal of great ferocity. The wild ass lives in the deserts of the centre ; the hyena and jackal in the provinces of the south. The Caspian Sea produces the sturgeon in great abundance, and a delicious sort of carp. The pigeon and partridge furnish an excellent food in abundance, which the inhabitants share with the birds of prey, the eagle, the vulture, and the falcon, animals which number among the native species of the wild mountains.

BOOK XXXII.

PERSIA CONTINUED.

Topographic details on the Provinces and Cities.

HAVING taken a view of Persia as a whole, we shall now turn our attention to its chief towns, and other objects of special geography, taking for our point of departure the former capital Ispahan, beginning with the central and north-west provinces, and proceeding to those of the south-east and east.

The vast province of Irak-Adjemi, which nearly corresponds to the Great Media of the ancients, takes its name from the first founder of the Persian monarchy; the Djemshid of the Orientals, and the Achæmenes of the Greeks. If *shid* and *menes* are considered as terminations, these two words may be reduced to one root, *Adjem* or *Achem*. With the Arabians *Irak* signifies Babylonia, and *Adjemi* is their name for the Persians. The name of the province, therefore, means Persian Babylonia.[a] This province occupies the greater part of the central plateau of Persia, and the description already given of this plateau is particularly applicable to it.

On its southern boundary we find the remains of Ispahan, that immense city, to which Chardin gives thirty-three miles[b] of circumference, and which, when he visited it, contained from 6 to 700,000 inhabitants. This superb capital, which the Persians considered as one half of the world, has now left a mere shadow of its former grandeur. The gardens which adorned the avenues, are now converted into corn-fields. We may travel for three hours on roads, which were formerly streets, before we reach the centre of the city. Still, however, according to the account of M. Olivier, the bazars[c] constructed by Shah-Abbas, which were covered in with vaults, and lighted by numerous domes, are of prodigious extent, and proclaim the former magnificence of the city. Sir R. K. Porter says he travelled under its massy arches considerably more than a mile, to where they terminate at the northern angle of the Royal Square; and that, after crossing the square, the bazar is continued at the opposite angle.

This vast square, called the Maidan Shah, one of the most extensive in the world, was formerly one of the chief ornaments of Ispahan; enriched with shops, where every commodity of luxury and splendid manufacture was exposed. Here also the troops were exercised, and the nobility exhibited their Asiatic tournaments before their king. In the centre of each side of this immense area, stands some edifice, remarkable for grandeur or for character. In the north-west is the great gate of entrance to the bazar, on which, in former times, stood the celebrated clock of Ispahan. The south-western side shows the Meshed-Shah, a superb mosque, built by Shah-Abbas, and dedicated to Mehedi, one of the twelve Imâns. On the north-east is the mosque of Looft Ullah; and on the south-east the Ali Kapi, or gate of Ali, forms a majestic parallel to the bazar porch on the opposite side. The length of the square is about 2000 feet,[d] and its breadth 700.[e] Each face presents a double range of arches, the one over the other; the longest range consisting of eighty-six, and the shortest of thirty. At a few paces from these arcades there is a constant supply of water, running through a canal of black marble, and opening into a variety of basins of the same substance, which are constantly full, and rendered more cool and refreshing by a close shade of elegant trees. The Sefi, or Ali Kapi gate, is described as one of the most perfect pieces of brick-work to be found in the Persian empire. Over the great entrance it rises into several stories, and the flights of steps which lead to them are formed of the most beautiful variegated porcelain. The roof of the large chamber over the gate is sumptuously gilt and carved, and supported by eighteen lofty octagonal pillars, once richly emblazoned in gold, but now faded. It is open on all sides but one. On the side nearest the balustrade facing the square, a round platform marks the spot on which Shah Abbas used to sit, and from whence he reviewed his cavalry, galloping and skirmishing beneath, or witnessed the combats of wild animals. The freshness of all the buildings is particularly striking to an European, or the inhabitant of any comparatively humid country, in which the atmosphere cherishes a vegetation of mosses, lichens, and other cryptogamous plants, which we particularly associate in our minds with the spectacle of decay. Above this there is a numerous range of small rooms, some of them evidently appropriated to purposes of carousal. From the roof of the building an extensive view of the city is obtained. In former times this was undoubtedly splendid, but at present, with the exception of the palaces in the gardens, the whole mass below is one mouldering succession of ruinous houses, mosques, and shapeless structures, which had formerly been the mansions of the nobility, broken by groupes or lines of various tall trees which once made part of the gardens of the houses now in ruins. Ispahan, though two thirds of it are in ruins, contains more than 200,000 inhabitants.[f] There all the mechanical arts are executed in the best style. In the south part of the city is to be seen the famous tract called Shaherbag, which bears a great resemblance to Versailles. It consists of a series of gardens, inclosed within four majestic walls: each garden has a separate palace adapted to the seasons, or to the changing humour

[a] Wahl, Asien, I. 209—217.
[b] "12 Fr. leagues."
[c] Olivier, Voyage, &c. V. p. 176.
[d] "200 toises."
[e] "100 toises."
[f] According to M. T——, there are 20,000 houses.

of the royal planter, who called them Hesht Beheste, or the "Eight Paradises." The prevailing plan of them all is that of long parallel walks, shaded by even rows of tall umbrageous planes, the celebrated chenar trees, of which the Persians are extremely fond, and which grow here in perfection. These are interspersed with a variety of fruit trees, and all kinds of flowering shrubs. Canals flow down the avenues in straight lines, and generally terminate in a large marble basin, ornamented with sparkling fountains of square or octagon shapes. The great number of avenues and canals, and the numbers of rills which are seen from any one point, have an uncommonly magnificent effect, and the different palaces belonging to the eight paradises are descried at different openings, glittering like so many gay pavilions. The traveller now mentioned, however, on drawing nearer, was less pleased with the architectural taste displayed in these structures. He found them gorgeous, but heavy and discordant, though loaded with every species of external ornament, in gilding, carving, painting, and inlaid mirror-glass. This was particularly the case with the Shehel Setoon, or Palace of Forty Pillars, the favourite residence of the latter Sophi kings. The exhaustless profusion of its splendid materials reflecting their own golden or crystal lights on each other, along with all the variegated colours of the garden, gave the appearance of an entire surface formed of polished silver and mother-of-pearl set with precious stones, a scene well fitted for an eastern poet's dream, or some magic vision in the tales of an Arabian night. The front is entirely open to the garden, and it is sustained by a double range of columns, upwards of forty feet high, each column shooting up from the united backs of four lions of white marble, and the shafts covered with arabesque patterns, and foliages in looking-glass, gilding and painting; some twisting spirally, others winding in golden wreaths, or running into lozenges, stars, connecting circles, and many intricacies of fancy and ingenious workmanship. The ceiling is equally ornamented, particularly with the figures of all sorts of animals, from insects to the large quadrupeds. At some distance within the front is the entrance to a vast interior saloon, in which all the caprice and cost of eastern magnificence are incredibly lavished. The floors of both apartments are covered with the richest carpets of the age of Shah-Abbas, but as fresh as if just laid down, a proof of the excellence of the dye, though some ascribe this and all similar phenomena, without any meaning, to the purity of the climate. So far as this cause is concerned, the only property of the atmosphere is the absence of dampness. A door in one angle of this saloon opens into a spacious and lofty banqueting hall, the sides of which are hung with pictures, mostly descriptive of convivial scenes, similar representations being also emblazoned on the doors and pannels of the room near the floor. Its lower range is spotted with little recesses taking the shapes of bottles, flagons, and other vessels indispensible in those days at a Persian feast, though of a character equally different from the abstemiousness that marked the board of the great Cyrus, and from the temperance which at the present moment presides at the Persian court. Sir R. K. Porter gives an interesting account of the subjects and execution of six large pictures, four of which represent royal entertainments given to different ambassadors in the reign of Shah-Abbas, and two are battle pieces: these are, in general, ill-imagined in point of taste, but executed with great nicety and observation. The hall of audience exhibits a profusion of very recent paintings, among which are several of the king, but wretched likenesses, and altogether they betray a decline of this fine art in Persia, while a similar comparison of the ornamented work shows that considerable progress in that department has been made. The river Zenderood, which divides the Shaherbag in two, has a beautiful bridge of hewn stone and brick, composed of thirty-six arches, with a gallery, covered on each side by a terrace, commanding a delightful view of the surrounding gardens, and the suburb of Julpha, situated on the margin of the river, though now in ruins. A little lower is another magnificent bridge built by Shah-Abbas, with wider galleries, and a hexagonal circuit of buildings[a] in the centre. Under the arches, the bottom of the river is so paved as to make the water fall in the form of a cascade, which is in full view of a fine palace built directly opposite, and surrounded with beautiful gardens. That these bridges might have a sufficient river flowing beneath them, Shah-Abbas introduced into the bed of the Zenderood, another river, at a distance of eighty miles[b] from Ispahan, by cutting a passage through some mountains at a great expense. Chardin describes the size of the river as equalling in spring that of the Seine at Paris in winter.[c]

The suburb of Julpha, which we have mentioned, also owes its origin to Shah-Abbas, who founded it for a body of Armenians whom he transplanted from their own country. The inhabitants of the opulent town of Julpha on the Araxes, having particularly conciliated his favour, by expelling their Turkish garrison at the sight of his troops, and opening their gates to receive him, he treated them as friends, but would not leave such valuable subjects behind so near the frontier, where they might at a future period fall into the hands of the enemy. He demolished the town, brought the inhabitants to Persia, and stationed them in this great suburb, naming it Julpha; and gave them here, as well as in other parts of his dominions, full toleration for the publicity of their religious institutions, and some valuable privileges as merchants. This occurred about the year 1603, and for more than a century the colony continued to prosper. To it Ispahan owed its great commercial character and its wealth. But in the Afghan invasion, the ill-advised monarch Shah Houssein deprived the inhabitants of Julpha of their arms, and it was abandoned to become the first prey in the bloody and rapacious hands of the Afghans. The noblest and best fell in front of these assaults, and few survived to maintain the good old character of the Armenian merchants. Their transactions are now only characterized by low cunning. Their trade and gains, and every circumstance that confers respectability, have been miserably reduced, and their habits have become disgustingly vicious, even the women being remarked for intem

[a] "Place hexagone."
[b] "30 French leagues."
[c] Chardin, Olivier, l. c. Memoires historiques, politiques et geographiques des Voyages de Ferriere-Sauvebœuf, II. p. 28.

perance. A strange irregularity has obtained a sort of sanction among them from established usage, that of temporary marriages. The mothers bargain with strangers for their daughters in this species of connection. The young women are said to be in every respect faithful to their lords during the whole term of agreement; when this expires, they are considered as free, but not degraded, and the pecuniary consideration which they have obtained, operates as a recommendation to a more permanent matrimonial alliance with their own countrymen. Not countenanced by Christianity, these arrangements are of course viewed with marked reprobation by consistent professors of that religion, and it is alleged that the want of principle thus betrayed lowers their general character even among the Mahometans, with whom concubinage is legitimate. The degree of neglect to which the children procreated by connections of this description are subjected, is justly viewed as aggravating their immorality.[a]

At present, Ispahan is in some degree recovering from its state of abject decay. Mohammed Hussein, whose talents have raised him to the place of Ameen-a-Doolah, or second minister of the king, being a native of Ispahan, has erected in it a splendid new palace, and enlarged and beautified many of the former edifices. Having, in the faithful discharge of his public duty, encouraged agriculture, and recolonized many deserted villages in the country, he has used similar means to populate the habitable streets of this city, by promoting the old manufactures, and striving to attract commerce back to its ancient channels. In Ispahan, as well as in the surrounding country, the effects of his good intentions are manifested; and if security in the possession of property were permanently established, and industrious habits formed, this desolate city might regain its ancient prosperity.

On the road from Ispahan to Tehrân, the residence of Shah-Futté-Ali, we pass by Kashan, containing 5000 houses, and a palace built by Abbas the Great. The silk brocades of this place are at present, as in former times, celebrated all over Persia. A particularly rich shawl of silk fabric is also made here, and in great request. It contains besides, a manufactory of copper vessels, which form an article of commerce between the town and the adjacent provinces, so that Kashan is one of the most thriving places in that quarter of the empire. The town is handsome, but more infested by scorpions of the most venomous description than any other part of the country.[b]

After this, we come to Kom, a large town of 2000 houses, where there is a mosque, to which many devout pilgrims resort, but it is partly destroyed by an earthquake. Large sums are paid by individuals for the privilege of having their remains buried here, as it has been the burying place of many sanctified characters. But this place, notwithstanding its sanctity, has been treated with a relentless spirit of destruction even by Mahometan invaders. About a century ago, the Afghans, being of a different sect, that of the Sonnites, gave it a blow from which it has never recovered. The neighbouring country abounds in wheat and cotton; but the water is brackish.[c] Owing to its proximity to the great salt desert, the heat of the summers are insupportable. It is hemmed in by rocky mountains to the southward.

Tehrân has acquired considerable importance by becoming the ordinary residence of the sovereign. It consists of 7000 houses. It is not newly built, as M. Olivier tells us: in the time of Abbas the Great it was an important place, and some of the last Sophis often resided in it.[d] During winter, it contains from 60 to 70,000 inhabitants.[e] The houses are of clay or mud, as is the case through the whole of Persia, and the walls comprehend a large extent of ground not yet occupied. The city is of a square form, and in the middle is another space also square, surrounded with walls, and within which is the royal palace, which is a structure of great extent and highly magnificent. For a position of general surveillance, the Persian monarch could hardly have chosen a better situation, being quite central between the north-west provinces, which border on Georgia, and those to the east, which are exposed to incursions from the Turcomans and Afghans. But it is not strictly the best locality, being extremely unhealthy during summer, from the exhalations emitted by the low ground moistened by the spring torrents which pour from the adjacent heights; although the same cause, by giving birth to an early verdure, contributes to the pleasantness of its general aspect. In summer, therefore, the court flies to the more temperate plains of Sultanieh, or Oujan, and the people to tents or villages among the hills.

To the south-east of Tehrân are to be found the extensive ruins of Rey, the ancient *Rhagæ* or *Rhagianæ*, known for a short period under the name of Arsacia,[f] 2000 stadia to the east of Hamadan, the ancient Ecbatana, and 500 from the Pylæ Caspiæ. Going north-west from Tehrân, we come to the cities of Kasbin or Kazooin, and Sultanieh. The latter, situated in a fine valley among rugged mountains, in a cold climate, has for a long time gone to utter decay.[g] In the 15th century, it was the thriving focus of the trade between India and Europe.[h] Zinghan is a town of some importance, twenty-four miles[i] from Sultanieh,[k] containing 2000 houses. Kasbin, according to Beauchamp, who determined its longitude, contained in 1787, 10 or 12,000 souls; the number of their houses was rated at 3500. The old palace of the king is still to be seen here, but in a very bad condition. It is celebrated for its manufacture of sabres. Ferriere says that it contains considerable copper manufactures, the metal being obtained from the adjacent mountains. Copper vessels of all kinds are better made here than in Turkey. There are always numerous caravans in the place, from Khorasan or Adjerbidjan, which make it an entrepôt of trade. It has been more than once nearly overwhelmed with earthquakes, so that at present little remains of its past

[a] Porter's Travels in Persia.
[b] Olivier, V. 170.
[c] Ham-doolla, a Persian geographer, quoted by M. Langlès in his edition of Chardin, II. 459.
[d] Langlès, note on Tehrân, in Chardin, VIII. 166. Pietro della Valle, III. p. 435. 12mo.
[e] "40 to 50,000."
[f] Mannert, Geographie des Grecs et Romains, V. pars I. 172, &c.
[g] Cartwright, in Persiâ, (Elzevir.) p. 245
[h] Ruy Gonzales Clavijo.
[i] "6 farsangs."
[k] Various MS. Journals.

grandeur but broken masses of domes and towers, and long lines of mouldering walls; yet the existing town has many fine edifices, and spacious gardens, producing fruits of great variety and delicacy of flavour.

Hamadan is, from its situation, one of the most agreeable towns in Persia. The houses are indifferently built, but being separated by gardens, which are watered by streams from the hills, they form a very agreeable whole. Here is the tomb of Avicenna.[a] Passing mount Elwend on the south-west of Hamadan, we come to Kermanshah, a flourishing town of 3000 houses, near which is mount Bisootoon, containing a singular monument called "the throne of Rustan." It consists of two halls, shaped out of the solid rock, in the form of a portico, the one being nearly double the size of the other; the largest is from twenty to thirty feet in both dimensions, and contains a colossal equestrian statue, besides several other statues, basso-relievos which are chiefly hunting pieces, and several inscriptions, all cut out in the solid mountain.[b]

To the north of Kermanshah, and the west of Hamadan and of Sultanié, we have a very mountainous country, where the grass and the foliage are never scorched by the summer heats; a country inhabited by the independent Koords, who are always ready to move their tents and their flocks out of the reach of any controlling power. This country is called Al-Djebal, or Persian Koordistan No frequented road passes through it. The snow remains on the mountains till August.[c] The valleys are filled with agreeable woods, orchards, cultivated fields, and pastures, which are always verdant. The villages are generally built on the tops of hills, and the burying grounds in similar situations. The Sunnite is here the prevalent form of Islâmism. Senney, the chief town, and containing 3000 houses, is surrounded by a very rich cultivation. The whole country is capable of furnishing 20,000 horsemen. Some of the tribes are entirely independent, as the Mekris, who have a capital called Shash-Poolah.

We are better acquainted with Aderbadjan, the Adjerbadjan of the Zenda Vesta, and the Atropatena of the ancients. These names signify "the Country of Fire," either from the worship of that element having taken its origin in this country, or from the volcanic irruptions to which it is subject. It is hilly, rugged, and cold; but possesses valleys which are very fertile in fruit and in madder. Here is Tebriz, or Tauris, a considerable town of 7000 houses. The bazars and other public buildings are very spacious; and the great square is said to be capable of containing 30,000 men drawn up in battle array. Tauris was the residence of the Persian monarchs for several centuries. It still possesses a great silk trade. The continual resort of Turks, Georgians, and Koords, gives it an appearance of great populousness. A large quantity of shagreen skin is prepared here, an article much used in Persia for shoes. This town is remarkable for its fine mosques faced with glazed bricks, and ornamented with alabaster, a rock common in the neighbourhood.

At present Tabriz is well known, from being the capital of the province of Adjerbidjan, and the principal residence of the heir-apparent to the Persian crown, Abbas Mirza, who is governor of the province. In distant ages this city rivalled Ecbatana. It has often been the victim of the contentions of kings, and has suffered in repeated wars from Turks, Persians, and Tartars. But its most destructive enemies have been two fatal earthquakes which occurred in the last century, in the years 1727 and 1787, and laid it in ruins. During these dreadful catastrophes upwards of 100,000 of the inhabitants perished. Yet a new city has risen over the ruins, and at present enjoys every prospect of increasing prosperity. It has been re-fortified by the prince, and surrounded with a thick wall, protected by bastions and towers, with the addition of a very deep dry ditch. Out of 250 mosques mentioned by Chardin, the ruins of only three are visible. The most considerable is that of Ali-Shah, erected nearly 600 years ago by Ali-Koja, and still presenting lofty arches, and the mouldering vaulted work of splendid domes; the whole of the building within and without has been cased with lacquered tiles of porcelain, adjusted into intricate and elaborate figures, with an ingenuity and taste which would honour the most accomplished artists of any age. The colours of those decorations are green, dark and light blue, interspersed with Arabic sentences in gilt letters; and a broad band of similar inscriptions, formed in white on this beautifully varied ground, and inter woven with flowers in green and gold, winds round the entire extent of the building.[d] This fine ruin is within the limits of the new city, together with the remains of the citadel. Here part of the old palace, with its attendant mosque, may also be traced, executed in brick work, and put together with the nicest care. This city has often changed with respect to its relative importance, and the numbers of its houses and inhabitants, from the effects of war, massacre, and forcible emigration.

The south-west part of Adjerbidjan contains also the town of Maraga, consisting of 3000 houses. This part is almost entirely comprehended in the basin of the lake Oormia. The town of Oormia is built on the west side of the lake, among steep mountains, where the winter is of nine months duration. The north-east part of Adjerbidjan is formed by the basin of the Karasou, a river which runs into the Araxes. It contains Ardebil, a thriving commercial town of 2500 houses. Excellent fruits are gathered in the neighbourhood, and agriculture is kept up by numerous canals for irrigation.

Persian Armenia or Erivan is a large valley, forming part of the basin of the Araxes, a river which in that part of its course still preserves its impetuous character, and, as described by the poets, appears to hate bridges:[e] The principal bridge, that of Djoolfa, has often been carried away. The lake of Erivan, enclosed in a basin of its own, has no outlet. Its waters are clear, and abound in fish. In this country, which is filled with highly picturesque situations, the climate is healthy,

[a] Abdool-Kerim's Travels from India to Mecca, translated into French by Langlès, p. 97.

[b] Memoires sur diverses Antiquités de la Perse, par M. Sylvestre de Sacy, in 4to. 1793, p 211.

[c] MS. Journal of M. Fabvier.

[d] Porter's Travels in Persia, vol. I.

[e] Pontem indignatus Araxes. *Virg.* L'Araxe gemissant sous un pont qui l'outrage. *Louis Racine.*

though somewhat foggy; the winter is long and severe, with heavy falls of snow; the summer is cold.[a] For several months the Armenian peasantry cover their vines with earth. They maintain that this is the place where the vine was first cultivated by Noah, and the quality of the wine which it affords ranks very high. The capital of Persian Armenia is Erivan. It is surrounded by an earthen wall. It has been in the hands of the Persians since 1735, when it was included among the conquests of Nadir-Shah.[b] It is the seat of residence of the Persian governor, who has the title of Sirdar, or general, and holds his office by a sort of military tenure; paying no tribute, but furnishing a certain number of troops during war. Its natural situation is remarkably beautiful. The river Zengay,[c] which passes the city on its way to join the Araxes, and is itself previously augmented by numerous streams in the neighbourhood of this city, contributes greatly to beautify and enliven it; while the assemblage of mountain and vale through which it flows can hardly be excelled. Another smaller river, called the Querkboolak,[c] is expended in supplying water for the necessities of the city. But Erivan has no longer the aspect of the capital of a large province, having been the prey of sanguinary invasions. Its appearance is ruinous, with the exception of the fortress. The number of its inhabitants is supposed not to exceed 15,000. A short way to the south-west is the celebrated Armenian monastery of Eitch-May-Adsen, or "the three churches," and mount Ararat, which is a sort of frontier to the territories of Persia and Turkey. The monastery has very extensive buildings, and is much resorted to by the Armenian pilgrims. Here the patriarch leads a life of as great austerity as the other monks. In the Armenian church the fasts are observed with a frequency and a rigour proportioned to the ecclesiastical dignity of individuals. Nactchitchevan, or Nakshivan, was formerly the second town in this province, but it has gone to decay, and its place has been occupied by Khoy, a town consisting of 1100 houses. At this place the present governor of the province, Abbas Mirza, spends a short time every summer in hawking and hunting; and it shares with Tabriz the views which this prince entertains of general improvement. It is more pleasantly situated than that capital, and possesses a safer foundation, though not lying so central for all the objects of the governor.

Many of the oriental, and several Christian authors, regard Persian Armenia as the first cradle of the human race. Here, they tell us, was the vale of Eden, the happy abode of our first parents. Here Noah's ark, after having floated over a shoreless ocean, rested on the summit of Ararat. But these two ideas have no natural connexion with one another. There is no necessity for the scene of our creation having been the same spot which was afterwards the quarter where the survivors of the flood were landed, and from which they were again to people the earth. But this plain distinction seems to have been overlooked, and the Euphrates has always been fixed on as one of the four rivers of paradise, respecting which no doubt could be entertained.[d] Deluc held that the terrestrial paradise was situated on an antediluvian continent, which the flood destroyed, and converted into a part of the ocean; and that the names Frat, or Euphrates, and Hiddekel, or Tigris, were given to those of paradise, the remembrance of which had been transmitted to posterity. This hypothesis has been thought most in unison with the books of Moses, considered as minute historical records. Some of the German literati, less scrupulous on this point than M. Deluc, look for the terrestrial paradise on the present continent. They consider the geography of the book of Genesis, like the astronomy of the Scriptures, as not forming an article of religious faith, but merely a poetical exposition of ideas originating with man, and of traditions transmitted in that wandering tribe from which the Israelites were sprung. Criticism thus unshackled furnishes explanations which may have some plausibility, but must be altogether uncertain. Some make an Eden of the whole of Persia, as the country first civilized, in contradistinction to the land of Nod or of wretchedness, the country of the wandering tribes, and to which Cain, stained with his brother's blood, was driven. This Eden was watered by four rivers; the *Gihon* or Oxus, the Araxes, called also Phasis or *Phison*, the *Frat* or Euphrates, and the *Hiddekel* or the Tigris.[e] The enchanted garden, the habitation of the first men, was designated by the Persian and Chaldean term *Pardès*, whence the Greek *Paradisos*, which was applied to all the royal parks of Persia, and is for that reason given to many places not included in Persia properly so called.[f] Eden, according to this hypothesis, was applicable to the whole or any part whatever of Persia. Others of the learned have understood by Eden, the whole of the east that was known to the first men, of whom traditions were collected in the form of obscure fragments by the Hebrew writers. Eden thus comprehended the basin of the Euphrates, the Indus, named Hind-Dekel, the Ganges or Gihon, and the Irabatty, called by Ptolemy Besynga, a name considered as allied to Phison. Admitting bold hypotheses of this nature, some have demonstrated that paradise was nothing else than the smiling valley of Cashmire.[g] These various researches afford but dubious and vague conjectures, and are perhaps worse than idle. We derive little more satisfaction from those which have been formed on Noah's ark. If, with M. Deluc, we admit the universality of the deluge as the effect of a sinking of the earth, and conceive the old continent to have occupied a part of the present ocean, there is nothing absurd in conceiving Mount Ararat to be the resting place of the ark. Armenia and Koordistan might, at that remote epoch, form a large island, which, being

[a] Philipp. à S. Trinit. p. 73. Tournefort, &c.

[b] In the original, "it has been in possession of the Persians since 1635." I have changed the date to 1735, to accommodate it to the clause added by the translator. Persian Armenia was ceded by the Turks to Nadir-Shah, 1738. He had defeated them in battle, 1735.—P.

[c] Porter describes these two rivers as issuing from lake Erivan, while Mr. Macdonald Kinneir, with M. Malte Brun, represents the lake as having no outlet. Tr.

[d] Dictionaries of Calmet and of Bruyzen la Martinière, on the words Eden and Paradise. Reland, Dissert. de Situ Paradisi.

[e] Wahl, Asien, I. 851, *sqq.*

[f] Paradisus, a town of Syria. (Pliny, V. 23. Strabo, XVI.)—a river of Cilicia, (Plin. V. 27.)—a river of Euphratic Syria, (Mart. Capella, IX. 5.)

[g] Buttman's Primitive Geography of the Orientals, (in German.) The same author on the Mythes, contained in the Primitive History of Moses, in the "Berliner Monathschrift," 1804.

nearer to the level of the sea than it now is, enjoyed a milder temperature. This circumstance, together with its central situation rendering it a convenient source for the diffusion of inhabitants over the rest of the continent, might be urged in favour of the hypothesis; but it is only a hypothesis. Profane history, civil as well as physical, does not go farther back than an epoch in which families of human beings, spread, like the animals and the plants, over the whole surface of the earth, presented no irrefragable evidence of their common origin.

Leaving these discussions as equally vain with the curiosity of those who search Mount Ararat for the wrecks of Noah's ark, we resume the sober details of our description. In a preceding book we described the provinces of Shirwan, Daghestan, and Georgia, in the region of Caucasus; countries which once belonged to Persia, but now to Russia. We proceed to that portion of Persia which lies along the Caspian Sea.

To the east of Armenia and of Adjerbidjan, and to the south of Shirwan, lies the fertile province of Ghilan, pleasing to the eye, but unhealthy. Its wooded mountains, and numerous rice fields, render the air humid. M. Trezel, who has just returned from it, informs us, that in crossing the forests with which it is filled, he was suddenly seized with a headach and sickness, which he could only attribute to the powerful exhalations emitted by plants, trees, and stagnant waters.[a] The extreme humidity of the atmosphere rusts the insides of watches, though kept with the utmost care. The inhabitants, however, remark, that the women, the mules, and the poultry, enjoy very good health. The most unhealthy months of the year are June, July, and August. In October, November, and December, there is generally heavy rain. In 1741 there was such a prodigious fall of snow, that the inhabitants were deprived of all communication, except by the roofs of their houses. The spring lasts several months. The meadows and the woods are at all times variegated with flowers. The soil being exceedingly fertile, produces hemp, hops, and fruits of all kinds, without culture. Oranges, lemons, peaches, and pomegranates, are in great abundance. Here, as on the banks of the Mississippi, the convolvuli,[b] with their luxuriant but noxious vegetation, suppress the growth of the oaks, the ashes, and the beeches. Natural vines also grow on the mountains, and attach themselves to the trees; but, for want of culture, the grapes make indifferent wine, unless mixed with others. The chief produce of the country is silk.[c] The Ghilanian women have blue eyes, light hair, a small figure, delicate features, and a good shape. At an early age the children are remarkably pretty, but the males become much less so as they grow up. The men are lean, uncleanly in their habits, and of an unsteady character. Their language is quite peculiar, possessing no affinity with the Arabic or the Persian. The population is reckoned at 50,000 families.

Reshd, the capital of Ghilan, is about five or six miles from the sea, in the best silk district. According to M. Trezel, it may consist of 3000 houses, and contains 2000 silk looms.[d] We may also mention Einselly,[e] a seaport frequented by the Russian vessels from Astracan.

We have already mentioned the high limestone mountains which separate both Ghilan and Mazanderân from the rest of Persia. The valleys which this chain of mountains contains are sheltered from the winds which blow from the Caspian; they have a dry atmosphere, a steady temperature, and a more regular distinction of seasons than the maritime parts of Ghilan.[f] This chain is crossed by two defiles, the one leading from Ardebil to Astara, the other from Casbin, by Roobar, to Reshd. Another near Langkerân, between the mountains and the sea, connects Ghilan with Shirvan. This mountainous part of Ghilan is called Dylem,[g] from the name of a tribe which has given sovereigns to Persia, and which Moses of Chorène mentions for the first time under the name of Delmi.[h] The name of Ghilanians, or Ghilakis,[i] is the same with that of the ancient Gelæ. The Ambarlins, or people of the valley, occupy the district of Tenkaboon, under a khan of their own.

Mazanderân, situated to the east of Ghilan, has a great resemblance to it in its physical character. High mountains on the south, and the Caspian Sea on the north, contain between them valleys covered with forests, and intersected by rapid streams. The air, at least in some places, is purer and more salubrious than that of Ghilan.[k] The inhabitants are stronger and healthier. Their eye-brows are bushy, and meet together, and they have thick hair. They live on rice, fish, and garlic. Wheat does not grow well here, but the sugar cane is cultivated, which is somewhat surprising for a latitude of 37°, and so near to the centre of Asia. It ripens four months sooner than in the West Indies, and affords an abundant juice, which the inhabitants express, and collect without art or care, obtaining only a coarse syrup or a thick paste. This product has an unpleasant taste, which might doubtless be corrected by better manipulation. A Russian merchant once attempted without success to introduce into this country a sugar-refining manufactory.[l]

The best town in Mazanderân is Balfrush, containing 5000 houses, and 25,000 inhabitants, and enjoying a prosperous silk trade. The iron of the province is wrought at Amol, where there is a magnificent bridge. Sari is the residence of the khans. It contains 4500 houses. Aster-Abad, an agreeable and picturesque canton, has sometimes asserted its independence of the sovereigns of Persia. Its city bears the name of the canton, and has manufactures of silk and of wool. It contains 3000 houses. The neighbourhood produces a valuable root used as a red dye for the beautiful stuffs of Persia. The port of Meshehed-Ser exports cotton, indigo, and Indian drugs. At Ashraf, a place containing 4000 houses, Shah-Abbas wanted to establish his residence, and fit out a navy; but the palaces of this

[a] MS. Journal. He travelled in 1806, in Ghilan and Mazanderân.
[b] "Lianes"—climbing plants in general.
[c] Gmelin's Travels in Russia, &c. III. p. 448, (in German.) Hanway's Travels in Persia, &c. part II. chap. 40 and 41. Forster, II. 320. Langlès' French Translation.
[d] Reshd contains 70,000 inhabitants. *Fraser.*—P.
[e] "Anzelly, or Inzelly."
[f] Gmelin, IV. 196. Compare, III. 366, (in German.)
[g] "Deilam."
[h] Wahl, Asien, I. p. 540, note.
[i] "Ghelaky."
[k] Gmelin, III. 447—476. Hanway's Travels, part II. ch. 42. Pietro della Valle, II. 208, &c.
[l] Trezel in MS.

place went to ruin before they were inhabited. Mazanderân is said to reckon 150,000 families, and from 6 to 700,000 souls.

The hilly part of western Mazanderân is called Taberistan, either from the name of the ancient Tapyri, or from an Arabic and Chaldee word, signifying a wooded mountain. It is here that a long defile, the chief of the Caspian gates, leads from Rey to Amol. Another defile leads from eastern Mazanderân, by the district of Komis, into Khorasan. The roads in Mazanderân are very bad: there is no navigation; the boats, open and badly rigged, are neither fit to withstand the waves nor the winds. The houses are built of brick and mortar, with flat roofs.[a] When a traveller of distinction enters a village, the inhabitants assemble, erect a tree in honour of him, and treat him with the spectacle of a wrestling match. The Ghilanians wear a conical cap: that of the Mazanderanians, mounted with furs, has a long point bent backward. The open jacket and pantaloons give them more of a European air than the other Persians.[b]

Two large portions of Persia still remain to be attended to; the one consisting of the declivity towards the Persian Gulph and the Indian Ocean; the other rising towards the plateau of Tartary, though the greater part of this last belongs to Afghanistan.

Proceeding in a south-west direction from Ispahan, we first cross the El-Ahwas mountains, anciently called *Parachoutra*,[c] or the Mountains of Fire. These are succeeded by a large plain, where there is an immense number of serpentine rivers, and where the atmosphere is hot and moist. The only tree to be seen is the palm, and rice the only cultivated crop. This is the ancient *Susiana*. Its capital, Susa, or the city of lilies, (Sus being the Persian word for a lily,) the most delightful of all the residences of the Great Kings, is now reduced to a heap of ruins. Susiana itself has lost its ancient name. That of Khusistan, under which geographers have known it since d'Anville described it, has also, according to Niebuhr, nearly been forgotten, and Looristan substituted for it. But some learned orientalists observe, that the real general name of the province is Khurestan, comprehending four subdivisions. 1. Husistan, corresponding to the country of the ancient Uxii, and enjoying a temperate atmosphere; 2. Khusistan, the country of the ancient Cossæi, who were a race of mountaineers, formidable for their robberies; this is the same as Looristan; 3. Susistan, or Susiana, properly so called; and, 4. Elam, or *Elymaïs*, which extends to the mouths of the Euphrates.[d] The last two are fertile countries, but unhealthy, and have been devastated by the Arabs. The tribe of Kiab has obtained some celebrity, since 1765, when the Sheik Soleyman procured three English ships of war, and made himself master of the whole Persian Gulph. The town Shuster, which is subject to Persia, consists of 3000 houses, and has a good trade in embroidered stuffs[e] and in silk.

From Shuster we may enter by the city of Rasi,[f] and by the defiles of Zindjeran, which are the ancient gates of Susiana, into Parsistan, or as it is called by the modern Persians, Farsistan, the *Persis* of the ancients, the finest province of the kingdom, and containing the second city in importance and celebrity. According to the account of the traveller Franklin, Shiraz, the capital of Farsistan, is situated in a fertile valley, about twenty-six miles long, and twelve broad, inclosed on all sides by lofty mountains. The circumference of the city is about four miles: it contains 2000 houses. It is protected by a wall twenty-five feet high, and ten in thickness, with round towers at every eighty paces. The citadel is built of brick. In front it has a large open space, furnished with a park of wretched artillery. The mosque of Kerem is magnificent, but in an unfinished state. The modern Persians excel in painting with blue and gold, in a way which is particularly brilliant as well as durable. The bazar presents a magnificent assemblage of shops. The tomb of the Persian poet Hafiz is to the north-east, at the distance of two miles from the ramparts.

There is no place in the world in which provisions are more plenty or of better quality than at Shiraz. It is impossible to conceive a more delightful valley than that in which this city stands. Its fields are covered with immense crops of rice, wheat, and barley. Harvest begins in May, and is generally over by the middle of July. Plenty of fruit is eaten here of the same species which are common in Europe, but much larger in size, and much more delicate in taste and odour, particularly the grapes and the apricots.[g] The climate is particularly fine, neither heat nor cold being experienced in the extreme. In spring, the air naturally mild and pleasant, is perfumed with the odour of the finest flowers, and the eye is delighted by their richly varied colours. The vales of Ooroomia and of Salmos, to the north-west of Tabriz, are the only places in the empire that can be compared with Shiraz and its autumnal bounties. The garden nightingale, which the Persians call *boolbool-hezar-dastan*, (the *turdus bubil* of Gmelin,) the goldfinch, and the linnet, unite at this season their melodious accents. So many pleasures, added to the politeness of the inhabitants, and the excellence of the police, furnish some foundation for the boast of its inhabitants, that their city has not its equal in the world. Scenes so charming were well fitted to inspire the genius of a Hafiz, a Saady, or a Djamy. The females, with large black eyes, and celebrated for their beauty and their attractions, had undoubtedly a large share in animating these elegant and tender poets. But this joyous and peaceful city has not always escaped the horrors of political revolutions. More than once taken by assault, it has been given up to fire and pillage.

We cannot proceed a step in Persia without encountering some monument of the cruelty of conquerors, and of human vicissitudes. Thirty miles[h] north-west of Shiraz, and about ten[i] to the east of the town of Mayn, are the famous ruins of Istakhar, or *Persepolis*, the ancient

[a] Forster, II. 315. Langlès' translation.
[b] This dress is figured in the Persia of the Elzevirs, p. 72. Trezel, MS.
[c] Hadgi-Khalfah, Abulfeda, &c.
[d] Wahl, Asien, I. 600. Assemanni, Biblioth. Orient. III. Part II. p. 419, 421. Michaelis Specileg. Geograph. Hebr. chap. II. p. 68.
[e] "Draps d'or," cloth of gold, brocades.—P.
[f] "Ragian."
[g] Franklin's Journey from Bengal to Shiraz, in Langlès' Collection of Travels, (in French,) ch. 9—14.
[h] "12 Fr. leagues."
[i] "3 or 4 Fr. leagues."

capital of Persia, in which Alexander triumphed, and in a moment of mad festivity gave way to the suggestions of a spirit of wanton destruction, of which he almost instantly repented. This city was destroyed ultimately by the fanatic Arabs,[a] as is shown in a memoir by M. Langlès, contained in his collection of travels.[b]

We have no satisfactory means of ascertaining the period at which Persepolis was founded. The best are perhaps those suggested by the appearance of the most conspicuous remains found on the spot. Accordingly, Sir Robert Ker Porter, in applying to this subject the exertions of an inquiring mind, aided by extensive erudition and correct taste, observed that the most remarkable objects contained in it, viz. the Shehel-minar, or "Forty Columns," produced in him the impression, that both as a whole, and in their details, they bore a strong resemblance to the architectural taste of Egypt; a resemblance sufficiently accounted for by the early hostile intercourse between the two countries, and their interchanges of inhabitants by captivity. About forty years before the conquest of Babylon by Cyrus, Nebuchadnezzar overran the whole of Egypt, and returned with the rich spoils of the country, and a multitude of captives. Cambyses, king of Persia, the friend and kinsman of the conqueror, was likely to share in the ingenuity and talents of the ingenious among the captives of the former; and when Cyrus afterwards added Babylon to his empire, he would then transfer them to his own country, and employ them in the superb edifices of Persepolis. Cambyses, the son of Cyrus, in his expeditions against Amasis and Psammeticus, kings of Egypt, carried off the richest ornaments of its edifices to decorate his palaces of Susa and Persepolis, and took along with him Egyptian workmen to place them properly in their new stations. Other princes followed the example, and Persepolis became the most splendid city in the east. The remains of the Shehel-minar continue to bear testimony to this fact. To describe them fully in this place would far exceed our bounds, and we must refer the reader to the account given by the traveller now mentioned, which, in graphic description, ingenious research, and irresistible interest, is not exceeded by any writing in existence. From his ample details we can only select a few lines as a specimen. The royal palace of Forty Pillars, or Shehel-minar, consists of a number of buildings, forming both a palace of ample magnitude, and a citadel, or bulwark for the capital, on a situation of a most commanding character. This situation consists of an artificial plain, or platform, cut out of a mountain, and having a higher part of the same mountain connected with its eastern side, being on the other three sides at a great elevation in a perpendicular precipice from the plain beneath. On the royal mountain, to the east, are the ancient sepulchres of the kings, consisting of artificial excavations. The extent of the faces of the square are 1425 feet in length on the west side, 802 on the south, and 926 on the north; part of the steep is faced up with gigantic square blocks of dark-grey marble, without mortar, but fitted with such precision as to appear part of the solid mountain. The general height seems to have been about fifty feet, though now much lowered by the accumulation of ruins beneath. The only road to the summit is by an ascent of steps on the western side, forming a double flight. The steps are broad and shallow, and ten or fourteen of them are cut out of one block of marble. The ascent is so beautiful and easy, that they may be ascended and descended on horseback with the utmost facility. On ascending the platform, the first objects that meet the eye are the remains of two colossal bulls, of a noble form and attitude, indicating that they were intended as symbolical representations of power. These are sculptured in the lofty sides of an enormous portal. Other symbolical representations in *basso-relievo* are found in different places of huge size, and rather strange mixtures of the forms of different animals. From the great platform, different others rise, distinguished by ruins, differing somewhat in their character, and the apparent destination of the buildings. On one of these are the striking ruins of the magnificent palace of Forty Pillars. Only a few of the pillars are standing entire, at different places, but the bases and other remains of the rest still exhibit something of the original arrangement. The former capitals and decorations of those which stand, and of many of the fragments, lying on the surface of the heap of rubbish, are beautiful and elegant, the taste different from the Grecian, yet correct and commanding in the highest degree, and executed with a delicacy which cannot be excelled; "I gazed at them," says this traveller, "with wonder and delight. Besides the admiration which the general elegance of their form, and the exquisite workmanship of their parts excited, I never was made so sensible of the impression of perfect symmetry, comprising also in itself that of perfect beauty." The height of each column in the colonnade, to which, in particular, he applies these observations, was sixty feet. These pillars seem to have been the supporters of ponderous roofs of massy timber. The traveller gives reasons for supposing that he has ascertained the precise part of this building which formed the banqueting hall where Alexander displayed his triumph, in setting fire to the fabric; the place where the kings of Persia received the homage of their subjects, displayed their magnificence, and dispensed their beneficent orders; also the private palace which was appropriated to the domestic intercourse of the members of the royal family. The numerous basso-relievos are highly valuable, as illustrating the ancient costumes and manners of the Persians, and their value has been in a great degree communicated to the European reader by the accurate plates of them contained in the Travels now referred to, accompanied with the author's exposition of their meaning. Those carved on the walls of the staircase, by which the platform is ascended, are numerous, exhibiting trains of Persian subjects from the different parts of the kingdom, bringing presents to the sovereign, led forward in small parties by officers of the court acting as masters of the ceremonies. In other parts are figures of the king on his throne, and over him a symbolical representative of him, in the form of a genius, or celestial type of the earthly potentate, conformable to the views inculcated by the ancient Persian

[a] Persepolis was not destroyed by Alexander, as Quintus Curtius asserted, but by the Arabs, in the 7th century. See Memoir on Persepolis, from the oriental authorities, in Langlès' Collection of Travels, III, 199, *sqq.* *Malte Brun.*—P.

[b] Langlès'. III. 199, &c. (in French.)

religion. Guards of different descriptions are also delineated, and animals, partly exaggerated and symbolical, and partly fair representations of nature, contributing to the effect of lively and extended ornament. Battles, single combats, and other incidents in the Persian history, are here, as well as in the other Persian relics of antiquity, represented sometimes according to nature, and at other times by symbols.

In the same neighbourhood is Nakshi-Roostam, or the Mountain of Sepulchres, where many celebrated sculptures have been cut in the white marble forming the face of the mountain. On the summit many sepulchres are cut out of the solid rock, and others are built of immense blocks of marble. This summit is ascended with difficulty, and chiefly by the assistance of ropes.

Between twenty and thirty miles from this place are the ruins of Mourg-Aub, shown by Mr. Morier to be the ancient *Pasargădæ*, a sacred city, occupied by the magi of old, and containing the tomb of Cyrus, the remains of an ancient fire-temple, and other buildings, with sculptures which have exercised the skill of many learned persons, and are well described in the travels of Morier and of Porter. There is a tomb here called Meshed Madre-i-Sulieman, or the Tomb of Solomon's Mother, a name given at random by the natives, and which is frequently done in such cases, showing the wide-extended fame of Solomon in the east. This tomb is well described by Porter, who considers it as the tomb of Cyrus, concerning which we have some interesting passages in the historians of antiquity.

The other modern cities of Farsistan, besides Shiraz, are of little importance. Komsha, Karzeroon, and Firoozabad, are the principal. The only one which merits particular notice is Yezd, situated almost in the centre of the former Persian dominions. Many geographers place it in Irak-Adjemi, and others in Kerman. It is on the road from Kerman to Ispahan, and inhabited partly by Guebres, or worshippers of fire. It possesses manufactures of carpets and stuffs of camel's wool, and a great trade in cotton cloth and silk. The immediate neighbourhood is well cultivated, and produces the finest wheat in Persia. Hence a Persian proverb, that "to enjoy life in perfection, a man must eat bread from Yezd, and the fruits of Adjerbidjan, drink the wine of Shiraz, and possess a Georgian wife." Yezd has 4500 houses.

The forests which are scattered over the mountains of Farsistan, and the waters which refresh its romantic valleys, give this province a great advantage over the arid plains of Irak-Adjemi. Oaks, birches, cypresses and mastick trees, adorn the mountains; the pomegranate, the plane, the orange, and the vine, enrich the level countries.[a] The horses have lost part of their former renown, but the race of sheep with large tails is preserved. Yet even this fine province has deserts of considerable width, extensive sandy plains, and many barren rocks. The rocks in the neighbourhood of Darabgherd furnish a celebrated and valuable article. This is *moum*, a kind of liquid petroleum, perfectly limpid, and of an agreeable odour.[b] The cavern from the walls of which this petroleum distils, is kept with religious care. It is opened once in the year by the governor of the district of Darab, and a small quantity of the moum is obtained, which is sent to the court of Persia. It passes in that country for a balsam of miraculous power, which immediately cures the most desperate wounds.

The sea shores of Farsistan have two important harbours in the possession of Arabian sheïks. The first and most southerly is Abu-Shehr, which the English call Busheer:[c] here vessels drawing twelve feet of water can, at high tide, lie close to the doors of the houses. The sheïk of Abu-Shehr possesses the island of Bahrein, which enables him to keep some armed ships of war called *galvettes*. It is of the greatest importance to the city of Shiraz, of which this is the nearest port, that the sheïk do not rebel. Bender-Rigk is a strong place, which holds in dependence a considerable domain.

There are many independent Arabs on the shore of the Persian Gulph, and they almost all live in the same manner. They subsist by maritime trade, and by the pearl and other fisheries. Their food consists of dates, fish, and dourah bread. The few cattle which they have live also on fish. Each town has its independent chief, who receives from it next to nothing in the form of salary or revenue. The arms of these Arabs are muskets with matchlocks, sabres, and bucklers. When they are at war all their vessels are employed in the service. These tribes, among whom that of the Houles[d] is the most powerful, all continue to speak the Arabic language, and are generally of the Sunnite sect, and consequently natural enemies to the Persians, with whom they form no alliances. The houses of these Arabs are so wretched that an enemy would think it lost labour to destroy them. As they generally have little to lose on land, if a Persian army approaches, all the inhabitants of the towns and villages go on board their little vessels, and take refuge in some island of the Persian Gulph till such time as the enemy retires.

Laristan, a maritime stripe of which is called Kersamir, or the hot country, has often formed part of the government of Farsistan. Lar, its capital, possesses manufactures of arms and of silks. Although the soil is sandy, the country is full of orange and lemon trees, and tamarinds; dates also are in great abundance They drink water which is preserved in cisterns, which they carefully boil to destroy a worm in it, which otherwise they believe would nestle between the skin and the flesh, and is as small as a hair. Whether this account of it in all its minutiæ be true or not, such a worm certainly often makes its appearance, and it is not till much pain has been endured, and even danger encountered, that it is got rid of. This malady is very common almost along the whole shore of the Persian Gulph.[e] Bender Abbas,[f] a port situated opposite to the island of Ormuz, is better known under the name of Gomberoon. It was formerly the most noted resort of ships in the Per-

[a] Franklin, Journey to Shiraz, I. p. 53, &c. of Langlès' French translation. Chardin, VIII. 228, 231, 428.

[b] Kœmpfer, Amœnitates Exoticæ, 516—524. Langlès' Note on Chardin, III. 311.

[c] "Bender-Boucher, Fr."

[d] Niebuhr's Arabia, I. 271—274.

[e] Kœmpfer, Amœnit. Ex. 525, &c. Compare Chardin, VIII. 473. (Langlès' edition.)

[f] Bender-Abassi.

sian Gulph, and the general emporium for goods. The Portuguese took possession of it, and in 1614 Abbas the Great, with the help of the English, drove them out. The trade of Bender Abbas has now greatly declined; and even the Dutch have abandoned that town, and withdrawn to the island of Karek. The entrepôt of the English is now at Bassorah. Bender Kæng is the most frequented harbour between Gomberoon and Abu-Shehr.[a] Both at Gomberoon, and over the whole of the coast, the heat is sometimes prodigious; and it often happens that a person who imprudently exposes himself to the rays of the sun at noon is suddenly killed by them.[b] The sugar-cane thrives in this quarter. Between Siraf and Baanan, in the midst of an arid upland plain, a series of rocks rise into view, which have the appearance of broken obelisks or ruined towers.[c]

This whole shore is lined with islands. We have just mentioned Karek, or Kharedge, where the Dutch, attracted by the goodness of the soil, the water, and the moorings, built a town in 1764. It is enclosed by coral reefs attached to a limestone rock.[d] Probably the other islands are formed of similar rocks, but not without some exceptions. Ibn-el-Ouardy informs us that the island of Kais produces excellent iron.[e] The largest and most fertile is Kishmis, which the Portuguese of the sixteenth century call *Queixom* and *Broct*. This last name reminds us that it was the *Oaracta* of the ancients. Of all these and other islands, shaded with cocoa nuts and bananas, none has obtained a celebrity equal to that of Ormuz; yet Ormuz is a bare rock, covered with red and white saline stones, without any water fit for use, and almost without vegetation. Commerce formerly made this spot a storehouse for the treasures of the east. It was abandoned in 1622, but of late has attracted the attention of the English, who have formed an establishment on it.

Kerman, which is extolled by the ancients for the excellence of its grapes, its wheat, and its mines, is at present known by its beautiful shawls of camel's wool, and by its stuffs, formed of the silky hair of a kind of goat similar to that of Angora.[f] It produces various medicinal drugs and gums: moum and tutty are found in it. It abounds in roses. Mount Khophez is covered with a perpetual verdure; but the interior half of the country is occupied by a vast desert. The city of Kerman, though flourishing by its manufacture of shawls and stuffs, seems to have lost its ancient porcelain manufacture. The real name of this place is Sirdjan.[g] The towns of Kermashin, Velazgherd, and Berdashyr, offer nothing worthy of notice. Khomda, or Hemedan, contains, according to a tradition among the Jews, the tomb of the fair Esther, and the wise Mordecai. The maritime part of Kerman, an unhealthy region, is called Mogistân, which means the country of date trees.

Mekrân, on the east of Kerman, is the *Gedrosia* of the ancients. It extends along the shore of the Indian ocean as far as the mouths of the Indus, and is bounded in the interior by Seïstan and Afghanistan. In its political condition, this province is more connected with the Afghân than with the Persian sovereignty. The most northerly and easterly parts of it, comprehending more than one half, are called Beloochistan, and are subject to the Afghans. The southern and western are more particularly called Mekrân; but even here, the influence of the Shah of Persia is slight and ambiguous. Chobar, and several other places on the coast, are subject to the Imân of Muscat, who thus enjoys a sort of ascendancy in the maritime parts. These, however, are poor and sandy deserts. It was here that the army of Alexander was subjected to such wretched privations in their attempt to return from India. The interior consists of high mountainous tracts, interspersed with fertile valleys, supplied with water by mountain torrents, but containing no permanent rivers which reach the sea. The communities consist of similar materials to those of the other hilly parts of Persia, partly agricultural, partly pastoral and predatory. There are many different tribes and independent chiefs, of whom the Belooches are the most numerous. There are also some Loori tribes, whose character for robbery is singularly infamous. They murder in cold blood on the slightest provocation, and abandon themselves to irregular inclinations of all kinds. Little disposed to family cares and affections, they rear few children, and keep up their numbers chiefly by man-stealing.

The women of Mekrân, in general, are not subjected to the same seclusion as in other Mahometan countries, and appear indiscriminately in public. Further details will be reserved for our account of Afghânistan. Seïstan, a province singular for the melancholy change both of physical and moral aspect which it has undergone, will also be described in the same place.

The great province of Khorasan, or the "country of the sun," might deserve a very extended geographical description, but we must here confine ourselves to the most remarkable points. Conterminous with Tartary, it is exposed to great variations of temperature. The soil, though in many places sandy and dry, produces in abundance all the necessaries of life, also a large quantity of indigo, gall-nuts, and cochineal, of a good quality. There are a great number of Turcomans in this province, which furnishes good pasture for their flocks. The finest carpets in Persia are made in Khorasan; and sabre blades are made here, equalling in reputation those of Damascus. The mountains furnish balass rubies and turquoises. The high reputation of the horses of this country leads us to believe that it was the native place of the famous Nysean horses, so much extolled in history. The ancients generally concur in placing the *Hippobotos*, or great stud of Persia, in the plains of Ray; so that it was necessarily on the way in travelling from Babylon, or from Persepolis to the Caspian Gates.[h] The denomination of the Nysean plain is still generally applied, though with strong doubts, to this *Hippobotos* of Media. Adhering to these data, we must consider the Nysean horses as a race diffused through a very wide country, since there were reckoned in the Hippobotos,

[a] Journal communicated by an Arab to M. T.
[b] Kœmpfer, Am. p. 720, 382.
[c] Idem, p. 434.
[d] Niebuhr's Travels, II. 297. (German.)
[e] Notices et Extraits des MSS. t. II.
[f] Olivier, V. 305—331. Niebuhr, Texeira, &c.
[g] Abulfeda, translated by Reiske, p. 262.
[h] Strabo, Geog. XI. 796—802. Diod. XVII. 110. Arrian, VII. 13 Eustah. ad Dionys. Perieg. V. 1017. Isidor, &c.

150,000 horses, or, according to some, 50,000 mares. But when we find Xerxes causing to be led in pomp, before his triumphal car, *ten* Nysean horses, consecrated, and magnificently adorned; when we find this same monarch drawn by Nysean horses, while none of that precious breed seems to have been assigned to his guards, or to his retinue,[a] we are tempted to think with the learned Mannert, that a distinction must be made between the great Hippobotos, destined to mount the whole of the cavalry, and the stud which was appropriated to the king at Nysa. But it may be asked what Nysa this was, among all those mentioned in ancient writings. The royal studs of Persia were, by the ancients, placed in Media; this name, taken in the very extended meaning given to it by Herodotus, may include Hyrcania and Parthienê, and in that case we may consider Nesa on the Tedjen, corresponding to Nysea on the Ochus,[b] as the country of the horses so much valued by the Persian monarchs.

For half a century the numerous towns of Khorasan were devastated by civil war, and they are now slowly recovering. Herat, which was formerly the capital of Khorasan, is now subject to the Afghans.[c] The first Sophi of Persia made Meshed the capital, which contained the tomb of Muza, one of the twelve great Imans of Persia, whom he claimed as his ancestor.[d] It consists of about 4000 houses. Nishaboor is a considerable town of about half the size of Meshed; Kelat is another, the birth-place of the famous Nadir-Shah; Nesa is another, rich in palms, in springs, and in the tombs of saints.[e] Roohi, a town of 2000 houses, is the residence of the prince Kelesh Khan, the chief of 12,000 wandering families. Between Nishaboor and Herat[f] are Meroo Shajean, and Meroo-al-Rood, situated in the fertile vale of the ancient *Margiana*, which terminates on the confines of the desert of Tartary.[g]

Khorasan is bounded on the west by Dahistan, the country of the ancient Dahi, and by Djordjan, which is the territory of the ancient city of Hyrcania. These countries have the same productions with Khorasan.

To complete our topographical view of Persia, we must make mention of the small districts of Komis and Kohistan. The first canton adjoining Mazanderan and Irak contains the town of Damegan. Here also is said to be a fountain, which sometimes sends forth a wind so impetuous as to carry off men and animals, and tear up trees by the roots; it is called Bad-khanêh, or the House of Wind, sometimes Tcheshmehi-Bad, or the Fountain of Wind.[h] The province of Kohistan is a mere desert; it is probably the crest of the central plateau of Persia. Tebbes is a good town of 1500 houses. Some connect Kohistan with Irak, others with Khorasan. The Persian geographer, Hamdoolla, makes it a distinct province, extending as far as Gaoor. A long tract, lying on the south side of the Hindoo-Coosh range of mountains, in Afghânistan, is called Cohistan by Mr. Elphinstone,[i] which certainly is altogether different, although those who place Cohistan, or part of it, near the mountains of Gaoor, or Paropamisus, would appear to connect them together.

[a] Herod. VI. 40.
[b] Strabo, XI. 776—779. Plin. VI. cap. 25.
[c] Forster, Voyage, II. 243.
[d] The mausoleum of Imam Rezi, of the sect of Ali, is said to have given origin to the city of Meshid. —P.
[e] Hadgi-Khalfah on the article Khorasan.
[f] Trulhier, MS. Journal.
[g] In 1825, the Khan of Khivea invaded Khorasan, with 30,000 men, and advanced to Meshid; but winter coming on, he retired S. E. to Sarkas, where he fortified himself.—P.
[h] Langlès, Note on the Travels of Abd-ool-Rizak.
[i] Account of the kingdom of Caubul.

BOOK XXXIII.

PERSIA CONCLUDED.

A Moral and Political View of that Country.

A GENERAL idea has already been given of the political condition of Persia. Our present object is to delineate the character of the people whose country we have just described; a subject which, though interesting, is confessedly obscure.

The ancient authors make a general distinction between the Scythians and the Persians. The oriental writers distinguish in the same way, Turan, or Asiatic Scythia, from Iran, or Persia. On the monuments of Persepolis this last name is written Eriene.[a] It is evidently identical with *Ariane*, known to the Greeks; but Ptolemy and Eratosthenes apply the name *Ariane* exclusively to eastern Persia. The old name of Iran, or Eriene, seems to have been restricted to this part, in consequence of Persia and Media having become warlike states, and rendered their own names illustrious. Herodotus, however, gives us a proof of the general extension of the name Iran, or *Ariane*, by telling us that the Medes were originally called Arii.[b] The name Iran never became extinct in the east. The Armenian geographer, Moses of Chorène, who was born almost on the spot, includes under the designation *Aria*, or Ariana, the whole Persian empire in the fourth century.

The Scythians of Asia have always been distinct from the Persians, and were their constant and implacable enemies. The latter distinguished the Scythians by the name of *Sacæ*, or *Sak*, which signifies dogs.[c] The Scythians appear, according to some not very good authorities,[d] to have founded, in fabulous times, an empire which embraced Persia and the whole of western Asia; such an empire, if it ever had an existence, has left no traces behind it. History only admits one known Scythian invasion, which took place 624 years before the Christian era. Very probably the wandering tribes of ancient Persia, such as the *Cossæi*, the *Uxii*, the *Mardi*, and other pastoral communities, were the remains of the Scythian hordes, who, after they were forced back into the mountains, continued to infest the cultivated plains with their predatory incursions.

The Parthians, who, two centuries after the death of Alexander, re-established in great glory the independence of Persia, were Scythians or Sacæ, according to some authors of middling authority.[e] Herodotus and other writers of greater weight, mention them simply as inhabitants of a province of eastern Persia. Nothing in their habits nor in the names of their kings gives any indication of a Scythian origin.[f] In short, we may consider it as clear, that up to the great revolution effected by the Arabians, and the Mahometan religion, Iran, or Persia, was peopled in general by the same indigenous race, divided into different nations, and speaking the same language, though with differences of dialect.

This conclusion, as drawn from historical testimony, might receive additional elucidation by a comparison of the early idioms of Persia, if time and barbarism had left us complete and incontestible monuments of that kind. The following are the facts which criticism has collected on this subject.—The most ancient dialect is the Zend language, in which the sacred books were written, which go under the general name of Zend-Avesta, books which, though not perfectly authentic, certainly contain very ancient traditions,[g] and most probably, some fragments anterior to the alleged destruction of the manuscripts of the Magi, which is attributed to Alexander.[h] It is repugnant to common sense to call that language a jargon invented at random by the modern Guebres; but it is difficult to ascertain the places where it was spoken. Those who most strenuously support the authenticity of the Zend-Avesta, vary between Bactra,[i] the most easterly, and Adjerbidjan, the most westerly country.[k] Perhaps it was never a vulgar, but always a sacred language, like the Sanskrit, with which it possesses many radical terms in common. The Pehlvi, or Pehloowan dialect, that is to say, the idiom of the warriors and heroes, seems to have prevailed in Irak-Adjemi, or the Greater Media, and among the Parthians. It has even been said that this was the only dialect spoken at the court of the descendants of Cyrus, and that of the Parthian kings. It is mixed with many Chaldean and Syriac words, but is not a mere dialect of the Chaldee, as Sir William Jones seems to think.[l] According to some authors, the Pehlvi is still in use among some tribes in the north of Persia, and among others the Paddans of Shirwan.[m] The Turkish geographer says that it is spoken in a part of Farsistan. The sacred books were translated into this language, and in it there are several inscriptions of the time of the Sassanides.[n] But, by degrees, the princes of this dynasty (who reigned from the year 211 to 632)

[a] Langlès' Notes on Chardin, III. 261. Wahl, Asien. I. 222.
[b] Herodot. VII. 62.
[c] Plin. VI. 17. Solin, c. 49.
[d] Justin, Hist. lf. cap. 3. Eusebius, Chronicon Paschal.
[e] Justin, II. cap. 1. (It is of the Parthians that Ammian. Marc. speaks, XXI. Compare XXIII. at the end.)
[f] Richter's Historical and Critical Essay on the Arsacides and Sassanides.
[g] Zend-Avesta, a work of Zoroaster, &c. by Anquetil du Perron, 1771. Kleuker's Translation of the Zend-Avesta, with a Commentary, (in German.) Compare Sir William Jones' letter to M. Anquetil, 1771. Meiners and Tychsen's different memoirs in the Gottingen Commentaries; but, above all, Richardson's Dissertation on the Languages of the Eastern Nations, prefixed to his Persian Dictionary.
[h] Massoodi, Notices et Extraits, I. 21. *sqq.*
[i] Heeren, Idees sur la Politique, &c. II. 403.
[k] Anquetil du Perron, Zend-Avesta, *passim.* Wahl, Langues de l'Orient, p. 182.
[l] Adelung. Mithr. I. 272. Sir W. Jones's Discourse on the Persians, in the Asiatic Researches, and the Notes of M. Langlès.
[m] P. Angelus à S. Josepho. Gazophylac. Pers. p. 199.
[n] Sylvestre de Sacy's Persian Antiquities.

banished the Pehlvi to the mountains of Parthiene, and introduced, even by express laws, the use of the Parsee, or the dialect of Farsistan. This language, softer than the Pehlvi, which, in that respect, excelled the Zend, must long before have had the ascendancy in the Persian monarchy. It is the only one which furnishes an explanation of almost all those Persian names which were known to the Greeks and Romans.[a] When the Arabians, in the seventh century, invaded Persia, the Parsee, banished from the court, lost its high reputation, and when it was meant to be restored to its former rank, under the Dilemites in 977, it was found to be corrupted by a large intermixture of Arabic. Yet great poets and able orators formed it into a rich and harmonious language, distinguished under the name of the modern Persian. The ancient Parsee, used among the Guebres, will owe its immortality to the Shah-Naameh, the historical work of Ferdoosi, and to the statistical account of Indostan, entitled Ayen Akbery, written in 1600; for in proportion as the true Parsee lost its predominance in its native country, it gained a fresh ascendency at the court of the Great Mogul. At the present day the modern Persian is banished from the north of Persia, and even from Tehrân, by the ruder language of the Turks. The term *deri*, or language of the court,[b] is now applied improperly to the modern Persian. It is so designated by Ferdoosi in the following passage:

"The language of the Persians was divided into seven different dialects. Four of these, the *Sooki*, the *Harohi*, the *Sagzi*, and the *Sewali*, are fallen into disuse, and never were esteemed fashionable; but the case is different with the other three, the *Parsee*, the *Deri*, and the *Pehlvi*. The Parsee is distinguished for its softness, and is spoken chiefly in the district of Istakhar; the Deri, derived from the ancient Persian, is celebrated for its politeness and elegance. Belook, Maroo-Shazan, and Bokhara, are the principal towns in which it is spoken. Some authors add to these Badhakshan."

Among these dialects, the Harohi or Herwi was spoken in Khorasan, the Segs or Sagzi in Segistan, and the Sewali or Zabuli in Zabulistan, a name given to the Soliman range in the present Afghan territory. Others mention also the Sogd, the Khoozi, and some other dialects. The Koord is like the Pehlvi, a mixture of Persian and Chaldee.

We must now take notice of a remarkable phenomenon presented to historical geography by the Persian language, both ancient and modern. In all its dialects, and at all periods, this language contains not only a great number of German words, but German inflections, and forms of syntax.[c] It contains also Danish, Icelandic, and English words, which are not German, but pure Gothic;[d e] and to complete these singular coincidences, it follows, in some measure, the Icelandic rules of versification, strange and arbitrary as they are.[f] This resemblance, not so strong or so uniform as has been maintained by Leibnitz,[g] who has been always copied by compilers, is still sufficiently so to arrest the notice of an Icelander taken to Shiraz, and sufficiently so to enable us to explain the ancient Persian and Scandinavian names by one another. Thus, the city of Pasargadæ, the name of which signifies, "an entrenched Persian camp," would in Icelandic be Parsa-gard; and this is probably the Persian name from which the Greeks have made Pasargadæ.

From the resemblance thus substantiated, system-makers have ventured to draw a thousand conclusions. The Goths and Germans they have found to be a Persian colony, and the Persian *Kerman* they make the etymon for Germany. Bold compilers have proceeded farther. A Scottish author, who revived the old error of those who confound the Scythians, the Getæ, and the Goths, has ventured to trace from Persia to Scotland the imaginary route of a chimerical people, whom he has formed from so many heterogeneous elements. These reveries vanish when we observe that the resemblance of the Persian to the Gothic is not stronger than that of the same language to the Sanscrit, and the other ancient idioms of Indostan.[h] On the other hand, the resemblance of the Sanscrit to the Greek and Latin is equally strong.[i] In short, from the recent observation of a great critic, the ancient Sclavonian, the resemblance of which to the Persian was already known, presents also more affinity with the German and the Icelandic, than the modern Sclavonian languages.[k] Thus all these languages resemble one another; no one is the parent language of the others, but they are all to be referred to some common but unknown origin. Perhaps men of one and the same race peopled all these countries previously to any historical records. Or perhaps ancient communications had diffused the same ideas of civilization, and had subjected to rules possessing great mutual similarity the sounds by which these ideas were expressed. We are not acquainted with the fact; but we know that no one of these nations has a better claim than another to be considered as the original stock.

The physical constitution of the Persians is similar to that of the Syrians, the Arabians, and the Jews. It is

[a] Reland, de Reliquiis Linguæ Pers. in Dissert. Miscell. II. 97—266. Adelung, Mithr. I. 275. Anquetil, Zend-Avesta, II. &c.

[b] *Dar* signifies a gate and a palace. We may remark its affinity to the Danish *dör*, the German *thor*, and the English *door*, all meaning the same thing.

[c] Adelung has mentioned 221 German roots in the Parsee. The infinitives end in *ten*, *den*, &c. The prepositive articles *bi*, *mi*, *der*, correspond to *be*, *ge*, &c. in German. Mithr. I. 284.

[d] This distinction between German and Gothic is not recognized by Adelung. With him the Mœso-Gothic, the oldest Gothic dialect of which there are any remains, is placed at the head of that branch of the Teutonic languages from which the German is descended. He also divides the provincial dialects of Sweden into two classes, the proper Swedish in the N. which has the nearest affinity to the old Icelandic, and the Gothic in the S. more nearly allied to the German.—P.

[e] The following are a few instances:

Fretem, greatness, (in Zend.)	*Freya*, nourishing power, (in Icelandic.)
Fretaum, nourishing, do.	
Thranfa, food, do.	*Trives*, to grow fat, (Danish.)
Gucochte, flock, do.	*Queg*, flock, do.
Khooda, God, (Parsee.)	*Gud*, pron. *Ghood*, God, (Swedish.)
Halnéh, pure, holy, (Pehlvi.)	*Halog*, holy, (Icelandic.)

[f] Compare Gladwin on the Rhetoric and Poetry of the Persians, and the Scalda, Iceland. MS. or Olafson's Poetry of the ancient Scandinavians, (in Danish.)

[g] "Integri versus Persice scribi possunt quos Germanus intelligat." Ot. Hanov. p. 152.

[h] Paul. à S. Bartholomeo, de antiquitate et affinitate linguæ Zendicæ Samserdamicæ, et Germanicæ.

[i] Schlegel on the Language and Learning of the Indians, ch. I.

[k] Schlœzer, in his edition of Nestor.

on the whole good, but the complexion even in the northern provinces has a tinge of yellow. It even assumes some degree of the olive hue, particularly in the men, in Farsistan and Kerman. The hair is black, the forehead high, the nose aquiline, the cheeks full, the chin large, and the countenance generally oval. People of rank and wealth are often distinguished by a larger make. A Persian female beauty has a middling stature, long black hair, large eyes, arched eye-brows, long eye-lashes, the complexion a fine carnation with a little red, the nose, mouth, and chin small, the teeth white, the neck long, the breast of moderate projection, the feet and the hands small, the shape slender, and the skin extremely soft. The men are generally robust, and well adapted for military exercises; but, from the dryness of the air, and perhaps the prevalence of saline matter in the dust, they are particularly subject to diseases of the eyes. Their heads are shaved, and generally covered with long crimson bonnets. The form and the ornaments of the turban vary according to rank, wealth, or private fancy. Those of the princes and grandees are covered with waving tufts of feathers, pearls, and diamonds. The monarch alone wears on his head the emblems of the sun, or of the terrestrial globe.[a] The beard is sacred with the Persians, and cultivated with the utmost care. For any one to touch it is an unpardonable insult. They often wear three or four light suits of clothes over one another, bound round with a girdle. The peasantry wear only one simple surtout of a square shape, but varying in width and length in the different provinces.[b] The same dress, however, has not been invariably retained. It appears from some paintings in the palace of the forty pillars at Ispahan, which represent the costume of the age of Shah-Abbas, that large turbans, full mustachios, and smooth-shaven chins, were then the fashion in Persia, which has now given place to the high narrow black cap of sheep-skin, and the long bushy beard; the latter appendage having been a costume of the empire many centuries before. The women cover their heads with pieces of silk of different colours. The clothes of the dancing women are shorter than those of the men, but in women of condition they descend to the toes.[c] Wide, light, and flowing, this dress has the air of a religious habiliment, or a magnificent undress. The veil is rigidly worn in the towns. A general fashion in the Mahometan nations of the east obliges the women of Persia to wear enormously wide pantaloons stuffed with cotton. The luxury of dress has sustained considerable retrenchments during the recent troubles.

Their dwelling-houses, like those of the Asiatics in general, are the reverse of ostentatious in their exterior, being generally built of earth or mud, and no windows appearing to the view of the passenger. They are almost all flat roofed, and only one story high. The only exceptions seem to be attached to local situations. At Sultanieh, the roofs are of the shape of bee-hives. At Lanker-Rood and Dey Nain, in Irak-Adjémi, those of the old buildings resemble the roofs of mosques, and seem to be the remains of an old fashion prevalent in that part of the country. At a neat village, called Koorood, in the same province, the houses have several stories, with flat roofs. Those of the richer classes are highly superb in the interior, yet simple in every thing that can be denominated furniture. The floor is entirely overspread with carpets; those of Herat being the richest and finest; and nothing else is required by prince or peasant for seat, bed, table, and devotional kneeling,—the only difference being in the quality. The custom of kneeling on their carpets at their prayers gives those articles of furniture a sacred character, and forms one reason for the custom of visitors always leaving their slippers at the door. The doors of the apartments are of carved or painted wood, and double, but always open during the day, the door-way being filled by a light curtain.[d]

The Persians eat twice or thrice in the day. Their dinner is at noon. Their best meal is the supper. The favourite dish of the rich is pillau, or boiled rice, variously dressed. Wheat is the usual food of the people. Melons, fruits, and confections, form the leading articles in the Persian entertainments. Persons of the bon ton[e] were, till lately, almost openly treacherous to the law of Mahomet in their predilection for the profane worship of Bacchus; but the common people have always been strangers to intoxication. Their meals, ceremonious and silent, never exceed an hour.

The following is Sir R. Ker Porter's description of an entertainment given to him by the prime minister of the prince of Adjerbidjan at Tabriz. He and his companions were shown into an extensive saloon, carpeted all over, and with the usual accompaniments of nummuds, which are long and narrow pieces of a thicker and softer substance, made of wool or felt. On some of these sat several of the officers of state, who rose on their approach; and after the usual compliments, the company took their station, sitting cross-legged on the nummuds appointed for their accommodation. When the host entered, all the company rose, and on being re-seated, he bowed to each person according to his rank, uttering a compliment suited to the esteemed importance of the guest. The routine of the entertainment was the following:—Kalioons, or smoking apparatus, were presented; then coffee served in very small cups, without cream or sugar; kalioons succeeded; then tea in larger cups. After this ten minutes were occupied in conversation, when the minister gave a signal for dinner to be brought. Several servants immediately entered, bearing a long narrow roll of flowered cotton in their arms, which they laid down, and spread before the whole company, who occupied both sides of the room. This napery was placed close to their knees. The next service was to set a piece of thin bread or cake before each guest, to be used as a plate and napkin. Then came a tray between every two persons, containing the following articles of food:—two bowls of sherbet, each provided with a wooden spoon of delicate and elegant workmanship; a couple of dishes of pillau, composed of rice soaked in oil or butter, boiled fowls, raisins, and a little saffron; two

[a] Wahl, Asien, I. plates III. and IV.
[b] Ibid. pl. V.
[c] Ibid. pl. VI.
[d] Porter's Travels, Vol. I.
[e] "Les gens comme il faut," people of fashion

plates with sliced melons; two others, containing a dozen kabbobs, or morsels of dry broiled meat; and a dish, presenting a fowl roasted to a cinder. The whole party along the extended web being similarly supplied, the host gave the signal for falling to; at which every back became bent, every face was brought close to the point of attack, and every jaw was instantly in motion. The rice, or other victuals, was, with a dexterity which to strangers appeared wonderful, gathered up with the fingers of the right hand, and at the same moment thrust into the mouth. No cessation could be observed in the universal, active transition of meat, melon and sherbet, from the board to the mouths of the grave and distinguished assembly. The sounds of mastication were particularly audible. At this repast the foreigners were rather losers from their awkwardness and want of success in gathering up such dishes as were in a comminuted state. The servants cleared away in the same order in which the things had been put down: water was carried around, and poured on their hands over a basin, which they dried with their pocket handkerchiefs. A kalioon with tea followed, and continued with a few interruptions during the conversation, which now, for the first time, took place. A fresh kalioon finished the entertainment, and the company rose to take their leave.

Their cleanliness, both in their persons and houses, has been praised; yet the common people are slovenly. In Persia a native never enters a room in boots or slippers, and a compliance with this custom is expected from foreigners. Where the unmannerly pride of the latter has objected to it, and yet political reasons rendered it advisable to receive such a visitor, means have been provided for receiving him in the open air. Another point of etiquette is to keep the head covered, and the English gentlemen in the entertainment now described were obliged to dine in their cocked hats and feathers, though somewhat incommodious.

The circumcision of the boys is performed by a surgeon.[a] The marriages are conducted through the mediation of agents. The wardrobe forms the only portion. The bride is conducted to her husband's house in the night with a grand procession, accompanied by the light of flambeaus, and instrumental music. Polygamy is allowed, but the first wife enjoys peculiar prerogatives. Their funeral processions are conducted with much show. They raise superb tombs to the rich; such are those of the twelve Imâns or vicars of the prophet, regarded by the Persians as his only legitimate successors.

The luxury of the modern has several points of resemblance to that of the ancient Persians. Umbrellas, sedan-chairs, carpets for the floors, and several other conveniences and luxuries, have been transmitted to us from the ancient Persians. Large gardens afford a solitary walk to the women of the great, whom jealousy, or conventional decorum, keeps aloof from the view of strangers. But though we are led to consider their home as their prison, such is the kindly influence of habit, that the mere idea of giving even the most handsome woman more liberty, such as an opportunity of being seen or admired, though at a respectful distance, by other men than their husbands, would be considered as a degrading insult, pregnant with misery. Sir R. K Porter had his curiosity gratified with a view of the anti-room, or private apartment of the prince's palace at Tabriz, in which the ladies and female slaves are lodged. It is all rose-coloured, and occupies one side of the square. The windows are particularly splendid, their frames being subdivided into a variety of fanciful patterns, as stars, circles, points, and a thousand serpentine conceits, flowing gracefully into each other, while the separations are filled with the most brilliant stained glass of all colours and shades. Adjoining to this there is a series of elegant bathing rooms, and spacious dressing rooms, the walls of which are covered with mirror glass, and the floors laid with the richest carpets.—Within the precincts of the harem, the wives and handsome female slaves are treated with great indulgence, which is sometimes carried to an imprudent length, so that these females, by an enormous expenditure in frivolous articles of dress, often ruin the richest masters. The Persian ladies regard the bath as the place of their greatest amusement. They make appointments to meet there, and often pass seven or eight hours together in the carpeted saloon, telling stories, relating anecdotes, eating sweetmeats, sharing their kalioons, and completing their pretty forms into all the fancied perfections of the east; dyeing their hair and eyebrows, and staining their bodies with fantastic devices, and not unfrequently with figures of trees, birds, and beasts; sun, moon, and stars. This is spread over the breast, as far down as the navel, to which point all their garments are open, for the display of these artificial embellishments. The Persian mothers have the happiness of being treated with the utmost respect and kindness by their children of both sexes, during life. It is rather an ambiguous glory for the Persians, that they have the credit[b] of being the inventors of eunuchs as guardians to the seraglios. It is, at all events, certain that the eunuchs were as numerous and as powerful at the ancient court of Persepolis as at the modern courts of Ispahan and Tehran. The education of the princes, so much admired by Plato, was, like that of the modern Persians, entrusted to eunuchs.[c]

In addition to an effeminate taste for trinkets and jewellery, the Persian still preserves the ancient practice of painting his eyebrows and beard black.[d] The Persian eunuchs, and the satraps of antiquity, were entertained at meals with vocal and instrumental music, performed by the dancing women, whom the Greeks called musurgæ, and who are now called bayaderes. All that Suidas and Athenæus have said of them applies to the modern Persians, and might seem to be copied by Chardin in his more recent descriptions.[e] The festival of Gulryzah, or the profusion of roses, is also of ancient origin; a fine climate, and a profuse vegetation, render it perpetual.

The great people in Persia never walk on foot.

[a] "Mais celle des filles, pratiquée par les Arabes, est inconnue chez les Persans."
[b] Herod. VI. Joseph. Antiq. Jud. X. 16. Steph. in voce *Spada*.
[c] Plato de Leg. III. Lucian in Eunucho.
[d] Olivier, V. 271. Xenophon, Cyrop. I. and VIII.
[e] Athen. III. Suidas, in voce *Musurgi*. Xenophon, Cyrop. IV. at the end.

Wheel carriages are not known among them, except one or two specimens of European manufacture in the possession of the royal family. They always travel on horseback; their baggage, and generally their women, being conveyed on camels. They travel in the night, as less exhausting to the constitution, and less threatening to their health, than the heat of the day. Following up the same principle, the industrious inhabitants of some of the manufacturing towns make a practice of spending some of the sultry hours of the day in the public gardens, under the umbrageous foliage of the trees, where they indulge in conversation, and leisurely social enjoyment.[a]

Many barbarous modes of punishment now in use are of ancient institution. Rebels were flayed alive, or sawed in two. The victims of political differences had their eyes put out, or their ears, noses, or hands cut off. These were amusements for the ancient, as they are for the modern sovereigns of this country.[b] During the civil contests which followed the death of Kerim Khan, Zackee Khan, who usurped the government, coming to the town of Yezdikhast, made a sudden demand on the magistrates for a sum of money due to the government, which he accused them of secreting. They denied the arrears, asserted they had no money concealed, and that it was out of their power to collect the sum he required. On finding the unhappy citizens firm in their declarations, he, without more ado, ordered a certain number of the most respected characters in the town to be taken to a rock, near the window where he sat, and immediately hurled to the bottom of the precipice, where they lay a mangled spectacle of horror. One of the wretched victims still survives, a circumstance which, to those who look at the height of the rock, appears miraculous. The present rulers are of a more benignant character; but the infliction of punishment is still often too summary. Robbery is wisely treated with the utmost severity; one of the princes having, in a journey, found a band of mountaineers in the act of dividing their plunder, caused their bodies to be dismally mutilated, and sent them to their friends and neighbours, to warn them of the consequences which that crime would now be sure to bring after it in Persia. How different this from the institution of regular trials, which, by the delay and deliberation which they imply, accustom the offended, however powerful and however justly indignant, to repress the acts which flow from their resentment; and how different from those countries in which tribunals and police are diffused alike through every corner of an extensive country, for it is well known, that at a distance from the immediate presence of royalty, the licentiousness of the marauder experiences little restraint from the Persian government. Mr. Kinneir tells us, that he saw two thieves built up in a wall, where they were left to perish.[c]

The ancient Persians, like the moderns, after being flogged by order of the king, returned their thanks to him on their knees, for attending to their correction and improvement.[d] Marks of the most shameful servitude were not in the least revolting to the ancient lords of Persia, as they are not to those of modern times. At the present day a courtier calls himself his master's dog; and we know that the Satraps, under the Parthian kings, lay down at the foot of the royal table, and respectfully took such leavings of the dishes as the monarch threw to them.[e f] The genuflexions of the highest subjects, and the titles of brother to the sun and the moon which they lavished on the Persian monarch, did not allow the latter to believe himself mortal. Like the modern Sophis, he lived inaccessible in his seraglio, surrounded by women and by eunuchs. All subjects, without distinction of rank, were entitled slaves. In short, the ancient history of Persia pourtrays, almost feature for feature, the same hideous spectacle of despotism and of slavery, which the modern annals of this country present to view. There is something frightful in this hereditary succession of the same vices and the same atrocities. The present monarch, and the most of his family, have the character of being in some measure honourable exceptions. They are said to be affable and humane, and harmonious among themselves. Renouncing the intemperate habits of some of their predecessors, sharing in their journeys all the toils and privations of the lowest subjects with an unaffected ease, they cultivate habits which are more manly and better adapted to persons whose duties embrace the happiness and protection of the whole of society, while their taste for information is directed to all those topics which tend to the general improvement. It is possible that, by their intercourse with the different polished countries of Europe, particularly through the medium of well-informed men who visit them, and communicate the information and the spirit which predominate in enlightened communities, they may lay the foundation for a new era in the national character and condition. If other countries will, in their turn, copy their habits of sobriety, the advantage may be reciprocal, and it may not be easy to say whether they will ultimately receive or confer the most substantial advantages.

It has often been said that the Persians are the French men of Asia. The inhabitants of Shiraz do indeed bear a little resemblance to the Parisians in the quickness and lightness of their walk, their volubility of tongue, their facility at turning a compliment, the delight they take in saying agreeable things about nothing, and the minute care which they take of their clothes and manner of dressing. The Persians have, in general, much subtlety and versatility of mind. In this they certainly exceed. Chardin, their best apologist, allows that they are deceitful, selfish, venal, and incapable of any act of spontaneous generosity. Their politeness is chiefly empty ceremony. Their hospitality is both sullied with much vanity, and accompanied by the hope of being repaid with presents. They seem to consider themselves as much wiser, and more sprightly than other nations; yet their wisdom, like that of many other countries, has not

[a] Porter's Travels in Persia, vol. I. p. 389.
[b] Herod. V. Plutarch, in Artaxerxes. Ctesias, in Pers. Xenophon, Expedit. I. Ammian. Marcell. XXIII. and XXX. Procop. de Bello Persico, &c.
[c] Porter's Travels.
[d] Nicol. Damasc. apud Strab. XII.
[e] Possid. ap. Athen. XIV.
[f] This practice of throwing victuals to one's guests, is at this day considered as a mark of peculiar regard. Kotzebue says in his Journey in Persia, that the Governor of Persian Armenia, at an entertainment to which he was invited, repeatedly collected pellets of rice in his fingers, and threw them into the mouths of his expecting guests.—P.

yet established a permanent system of practical political happiness, for they continually fluctuate between anarchy and despotism. Mild and humane in time of peace, their temper is completely altered in their civil wars. But victors or vanquished, rich or poor, their gaiety and presence of mind never forsake them; and it often happens that the most violent quarrels are succeeded by immoderate bursts of good humour.

The Mahometan religion, which is now that of the greater part of the Persians, has in that country lost much of its characteristic intolerance and fanaticism. Being Shiites, or followers of Ali, the Persians bear a deadly hatred to the Turks, and others of the sect of Omar. In the festival of Hosseyn, the son of Ali, one of the greatest saints of the Persian sect, the streets of Shiraz ring with imprecations against the Sunnites.[a] This hatred is probably kept up by the political rivalry of the two empires, and no such feelings are cherished towards other religions. In no part of the east are the Christians of Europe better received. The Jews and Armenians are subjected to grievances, but less so than in other countries. They have long ceased to persecute the Guebres, or fire-worshippers. The reigning king even tolerates, in spite of the Persian clergy, various Mahometan sects, and among others, the Ishmaelites, whose patriarch resides at Khekh, in Irak-Adjémi.[b] The clergy experienced a still more marked affront under the reign of the famous Nadir. This conqueror, who, in the prosecution of his profound but cruel policy, meditated a re-union of all the Mahometan sects, brought together one day the mollahs, or doctors in theology, and the Imâns, or ministers of the mosques, and asked them what use they made of their revenues. "We employ them in works of piety," was the answer; "we pay persons to offer prayers for the prosperity of the empire; we educate the youth in the public colleges." The despot thus addressed them in reply: "The calamities which the empire has now for half a century experienced, demonstrates the inefficiency of your prayers; as for the colleges, I will look after their support; and as my soldiers, the supports of the religion and the state, are the only true mollahs, I ordain that your property shall be confiscated to their use."[c] The Persian mosques differ from the Turkish, in having no minarets, a difference probably rather founded in architectural taste and fashion, than proceeding from any peculiarities of religious opinion.

It is worthy of our notice in this place, that there exists in Khoosistan a very remarkable Mahometan sect, that of the Zabians, who have been erroneously called Sabeans, and thus confounded with the adherents of the ancient worship of the heavenly bodies called Sabeism, and also with the people of Arabia Felix, known under the name of Sabâ and Shabâ, which the Greek geographers have rendered Sabæi. The sect now mentioned, though it has some establishments in the neighbourhood of Bassora and Lahsa, has nothing in common with the Sabeans of Yemen, nor with the worship of the stars. It was founded in the ninth century by one Nassaïri; and its religious books, written in a Syriac dialect approaching to the Galilean, show the country to which it owes its origin.[d] As the Zabians venerate the cross, as they employ a kind of baptism, and call themselves "the disciples of John," they were thought at one time to be a sect which had originated along with the Christian religion in Galilee; but this opinion has been sufficiently refuted. Their doctrines nearly resemble those of the Ishmaelites, and partly those of the Guebres. The name John, according to a learned orientalist, signifies "light," and has nothing in common with the denomination of the Christians of St. John in India.[e] Perhaps it is rather a remnant of the ancient Chaldean fable of the prophet and demi-god Oannes. The Zabians sacrifice poultry along with a ram. Their marriages are accompanied by several ceremonies, referring to the preservation of virginity.[f]

The sciences and belles lettres made a brighter figure in Persia, under the sophis, than in any other country of Asia subsequent to the time of the caliphs. The poems of Ferdoosi, of Saadi, and of Hafiz, have been read with delight in European translations. The lively and exuberant imaginations of these authors breathe the perfume of roses, listen only to the sweet notes of the nightingale, and live in the world of genii and of fairies; but there is little solidity in their thoughts or sentiments. We have in their writings the picture of the Persian soil, with its paradises and deserts. Some feeble lights of literature still subsist, which the reigning sovereign endeavours to cherish and extend. The Arabic, Turkish, and Persian languages, eloquence, poetry, theology, medicine, and astrology, are taught in numerous seminaries. Were it not that Turkey intervenes as a barrier between European light and the genius of the Persians, we should probably find this Asiatic nation making an extraordinary step of advancement. In Persia, men of learning are held in esteem, and the most important places are conferred on them; while in Turkey the most ignorant barber may be made the mufti, and a porter, who can neither read nor write, a minister of state.[g] From some of the details contained in this and the preceding book, it will appear that the powers of imitation and invention, as displayed in the arts of painting and of statuary, are not proscribed in Persia as they are in Turkey, although the degree of proficiency has been variable at different epochs, and is at the present moment far from being high.

The natural talents of the Persians have found exercise in the career of industry. Chardin has given a very minute description of the manufactures and trade of Persia in the seventeenth century. The art of embroidering on cloth, silk, and leather, was carried to a high degree of perfection. There were manufactures of pottery in every part of the kingdom; the best came from Shiraz, from Meshed, and from Yezd. That of

[a] Franklin, II. 92—95.

[b] Rosseau, Annales des Voyages, XIV. 279.

[c] Langlès, Chronological note in Chardin, X. 211.

[d] Norberg, in Michaëlis, Biblioth. Orient, XV. p. 126—143. Niebuhr's observations in the same work, XX. p. 1. and Norberg's reply, p. 149. The same author, de Religione et Lingua Sabæorum in Comment. Gotting. XV. M. Norberg, a learned orientalist, and Professor at Lund, is now engaged in a work on the dialect and doctrines of the Zabians.

[e] Tychsen in the German Museum, 1784, and in Murr's Journal, first number. Bruns, Repertor. Orient. XVII, p. 25, &c. (M. Langlès is about to publish the alphabet of the Ssaby, or Zabians.)

[f] Boullaye-la-Gouz, Voyages, p. 303. Chardin, VI. '48—143, &c Nieb. II. 141.

[g] Olivier, Voyage en Perse, chap. 10

Zarang equalled the porcelain of China in fineness and transparency. Some of it possessed the property of resisting fire, and was so hard and tough that mortars were made of it, in which hard substances could be pounded. The porcelain made in Kerman is renowned for its lightness and elegance, and it is from this province, then called Carmania, that Pliny tells us that a part of the famous murrhine vases were brought to Europe.[a] These were probably only a sort of porcelain formed by a process now lost. The manufactures of leather, of shagreen, and of morocco, are as old as the Parthian kings, and perhaps the days of Cyrus.[b] They subsisted when Chardin travelled, and are still in a flourishing state. The Persians are great braziers; they employ the tin of Sumatra in tinning their kitchen utensils. The bows of Persia were the most esteemed of the east, and their damasceened sabres, made of the iron and steel of Indostan,[c] were considered by Chardin as surpassing the skill of any armourers in Europe. Their razors and other steel manufactures were also much in request. They excelled in the cutting of precious stones, and in dyeing colours which united brilliancy with durableness. Their glass manufactures were less deserving of notice. Their cotton and woollen stuffs, and those made of goats and camels hair, their silks, their brocades, and their velvets, had arrived at great excellence. The carpets so highly valued came chiefly from the province of Seghistan. Chardin adds, that in his time, they were called Turkey carpets, because they passed through Turkey on their way to Europe. The camel-hair stuffs were generally made in Kerman, and those of goats-hair in the mountains of Mazanderân; but the cotton cloths came chiefly from Indostan. The making of broadcloths was not known, and their place was supplied by a kind of felt. The king himself had a share in the trade of silk, brocade, carpets, and trinkets, which probably fettered in some measure the freedom of commerce in the country. Silks of different qualities were the staple commodities. The exports to India consisted of tobacco, preserved fruits, particularly dates, wines, horses, porcelain, and leathers of different colours. Those to Turkey were tobacco and cooking utensils; and to Russia, manufactured silks.

Nor has this state of things changed so much as might be supposed. Excellent sabres are still made at Casbin, and in Khorasan. The fine quality of the steel is known by its waving clouded streaks. They are damasceened with gold. These blades do not bend. The sabres of Casbin cost from sixty to eighty dollars,[d] but those of Khorasan are as high as a hundred sequins, or upwards of L.30 sterling.[e] Among the Persians as well as the Turks, all metals are hammered cold; even the horse shoes are made in that manner. This is said to give them greater solidity. The Persians are still acquainted with the silvering of glass, and the cutting of diamonds. They do not seem, generally speaking, to have lost any of the arts which they practised in Chardin's time, and they have acquired some new ones, such as the art of enamelling, which they execute very well.[f]

The want of building timber, and the heat of the climate, seem to have prevented the Persians from establishing a navy in the ports which they possess on the Persian Gulph. All their maritime trade is conducted by foreign vessels. The most lucrative used to be that which they carried on by Ormuz and Gomberoon with the English and other nations, but their perpetual wars have now ruined it. Yet the goods which annually enter the Persian Gulph are estimated at half a million sterling.[g] Two thirds are brought by the English, and the remaining third by the Moors, the Indians, the Arabians, and the Armenians. The cargoes of the vessels consist of rice, sugar, and cotton; Bengal muslins, plain, striped, or embroidered; spiceries from Ceylon and the Moluccas; coarse white and blue cloths from Coromandel; cardamom, pepper, and Indian drugs. Were Turkey in Asia in the possession of European powers, the Persian Gulph might recover all its ancient importance. Caravans between Bassora and the Syrian ports would offer greater security than the navigation of the Red Sea. The Danube might also receive the fleets from Trebisond and the Phasis, loaded with the merchandise of Persia. On the other hand, if the Afghan power were consolidated by the conquest of Bucharia and of Kowaresm, Russia would not long delay to conclude a treaty with this people, by which she might divert to the Caspian Sea a part of the valuable trade which now goes down the Ganges, and round to the Thames.[h]

Such is the general idea which we have formed of the Persians, on comparing the relations of travellers with one another. But the sketch must be avowedly incomplete, till we take into view the numerous pastoral tribes dispersed over every part of the territory, which, according to the most recent accounts, form a sort of second nation, almost independent of the Persians, and often hostile to them.[i] We shall subjoin to the present book a tabular view of these different nations. The Turcoman hordes diffused over the northern part of the empire, reckon 420,000 individuals. The Efchar tribe in Adjerbidjan, which is 88,000 strong, gave birth to the ferocious but able Nadir Shah. That of Katchar, which consists of 40,000, and which lives in the neighbourhood of Tehrân, has given Persia her present sovereign; and the Turkish language prevails at the court of Futteh-Ali-Shah. The Koordish tribes of Persia, among which the Erdilany are the most powerful, amount to 90,000, not including the agricultural Koords. The Loor, or Loorian tribes, whose population is estimated at 140,000, chiefly roam among the mountainous countries between Khoosistan and Irak, and which, from them, have received the name of Loo-

[a] Pliny, XXXVII. 2.

[b] See the passages quoted by Mongez, in his memoir on the Persian costume, in the Memoirs of the French Institute, Literary Class, IV. p. 152. Compare p. 86.

[c] Chardin, IV. 136. Langlès' edition.

[d] "Piastres."

[e] "750 livres Fr."

[f] Beauchamp, Journal des Sçavans, 1790, p. 736.

[g] "Twelve million livres."

[h] European and Indian merchandise enters Persia, to a large amount, by Bender-Bushir, on the Persian Gulph. This trade is in the hands of the English. European goods are also introduced from Russia, by the Caspian, and by the Black Sea, through Teflis. Goods, from Turkey, enter Persia through Erzeroom, from Trebisond by the Black Sea, and from Constantinople and Smyrna by caravans; also, through Bagdad, from the Levant, by caravans.—P.

[i] See the subjoined table of the Persian nations.

ristan. They speak a dialect of their own, which still sufficiently resembles the Koordish language to have been sometimes confounded with it.[a] As Hadgi-Khalfah maintains that three languages are spoken in Farsistan, the Parsee, the Arabic, and the Pehlvi, we may, with considerable probability, infer that the Loorish language, the only dialect now known in Fars, besides the Arabic and Parsee, is the Pehlvi, or at least a dialect of that ancient language. The coast of the Persian Gulph is, in a manner, given up to the Arab tribes already described; but there are also in the interior some wandering tribes of the same nation, amounting to 90 or 100,000 persons. A particular class seems to be formed by the Ghelaky, in the mountains of Ghilan, who, within their own community, speak a peculiar idiom, while the Ambarlins, or inhabitants of the valleys, speak a dialect of the Persian.[b] The Paddars, the Hassarais, and other tribes who are little known, wander along the banks of the Araxes.

All these wandering hordes receive among the Persians the common appellation of Elaut. They have long constituted the principal strength of the Persian armies,[c] and it is by them that the country has been revolutionized, as the Roman empire was overthrown by the Goths. An Elaut always affects a kind of independence, and measures his deference to civil authority by his existing situation; obeying on the side of his stream, or disobeying in the fastness of his mountains. On this account, as a check to this unconnected and wilful political character, the fashion has arisen of drawing their principal chiefs to court, where many of them are found mingling the refinements of the capital with their bolder habits; delegating, in the mean time, their authority over their tribes to the chiefs next in rank. With a government and people who have a nascent taste for national improvement, this arrangement may in time become productive of all the most important advantages of an extended representation.

Of all these tribes, none has made so much noise as the Afghans, called in India Patans, who are generally considered as belonging to the Persian empire, and occupying its eastern provinces; but having for a long time maintained an independent government, will be described in another book.

Table of the Geographical Positions of Persia, astronomically observed.

Names of places.	Long. E. from London.	Latitudes.	Observers.
	deg. min. sec.	deg. min. sec.	
Balfroosh	. .	36 34 43	Trezél.
Tehrân	. .	35 39 55	The same.
Casbin	49 33 15	36 11 0	Beauchamp.
Tauris, or Tabriz	46 25 0	38 4 0	Major Menteith and Mr. Brown.
Ispahan	51 50 15	32 24 34	Beauchamp.
Yezd	. .	32 7 11	Trezél.
Ormuz	. .	27 8 0	The same.
Lar	. .	27 21 15	The same.
Abu-Shehr, (or Bender Boosher)	. .	28 59 0	Niebuhr.,
Shiraz	. .	29 36 37	The same.
Sina, or Sneirne (probably Sinné, or Senney, in Koordistan)	. .	34 23 35	Simon, French consul. See the Phil. Trans. 1755, vol. XLIX. p. 251, and Zach's Corresp. III. 571, &c.

[a] Compare Otter's Travels, I. 267, (in German.) Sanson's Travels in Persia, p. 222.

[b] Gmelin's Travels in Persia, III. 350 and 352, (in German.)

[c] Abdool Kervm's Journey from India to Mecca p. 37, (Langlès' trans.)

Comparative Table of the Ancient and Modern Divisions of Iran or Persia, including Afghânistan, or Eastern Persia.[d]

Modern Provinces.	Ancient Provinces.	Chief Towns.	Sovereigns.
Shirwan	Albania	Shamakie, &c.	Russia, or khans who are vassals of Russia.
N. B. For the subdivisions see Book XXV.	See Book XXV.	See Book XXV. Shooshe	
Erivan, or Persian Armenia	Armenia Persica	Erivan	Futteh-Ali, Shah of Persia.
See B. XXVII.	See B. XXVII.	Nackshivan Khoy.	
Adjerbidjan	Media Atropatene	Tauris Ardebil Maraga Oormia	The same.
Ghilan	Country of the Gelæ or Cadusii	Recht	The same.
*Dylem		Astara	
*District of Lengkerân		Einselly Lengkerân	Khan dependent on Russia.
Mazanderan	Western part of the Satrapy of Hyrcania		
(Annexations)		Balfroosh	Futteh-Ali-Shah.
1. Taberistan	Country of the Tapyri	Sari	
2. Djordjan, or Korkan	Hyrcania propria	Astrabad	
3. Dahistan	Country of the Dahæ	{ Ashraf { Amol	
Khorasan	Parthyene	Meshged Nishaboor Toon	The same.
	Aria	Herat	The king of the Afghans.
		Roohi	Khan almost independent.
	Margiana	Maru-el-Rud	Usbeks of Bokhara.
Irak-Adjemi	Media magna	Ispahan	Futteh-Ali-Shah.
*Isfahaun		Tehran	
*Kom		Kashan	
*Kashan		Kom	
*Rey	Media Rageiana	Kasbin	
*Hamadan,&c.	Cambadene	Hamadan	
(Annexations)	(Isidor)	Kirmanshah, &c.	
Kohestan	Tabiene	Tebbes	
Komis	Comisene		
Persian Koordistan	Part of Assyria, &c.	Senney	The same.
		Shaush-Poolah	Independent tribes of Mekris and Eilbas.
Khoorestan	Susiana (satrapy)	Sooster, or Tchootchter	Futteh-Ali-Shah.
1. Hoosistan	Country of the Uxii		
2. Soosistan	Susiana propria		
3. Khoosistan, or Looristan	Country of the Cossœi, or Syro-Media		
4. Elam	Elymaïs		Arab tribes scarcely subject.
Farsistan	Persis, or Persia propria	Shiraz	Futteh-Ali-Shah.
1. Khooreh Ashek	Parætacene	Komsha	
2.—Kobaad		Yesdekast	
3.—Shapoor		Kazeroon	
4.—Ardshir			
*Kermassyr or Shif-el-Bahr	*Mesambria, (*i. e.* southern coast)		

[d] The table, as given by the author, is translated here entire, although the more precise information which has been obtained since the original work appeared has led us to give the Afghân empire, in Eastern Persia, a separate place. See Book XXXV.—Tr.

Table continued.

Modern Provinces.	Ancient Provinces.	Chief Towns.	Sovereigns.
5.—Arradjan		Bender-Rigk	Arab tribes
6.—Dshiaur (Firoozabad)		Bender-Aboo-sher Firoozabad	scarcely subject.
7.—Darab	Pasargadæ . .	Aberkhon	
8.—Istakhar	Persepolis . .	Darabgherd	
9.—Aberkon .	. . . . .	Yezd	
10.—Yezd . .	Isatichæ of Ptolemy		
Laristan . .	Part of Mesambria, or Persis Maritima	Laar, or Lar .	Futteh-Ali-Shah.
*Part of Kermesir		Taroom	
*Hormooz, a province in the middle age .	Harmuzia	Funit Bender-Abbas, or Gomberoon	(Arab Sheïk dependent on the Imân of Muskât.)
Kerman . .	Carmania . .	Kerman or Sirdjan . . .	Futteh-Ali-Shah.
Sirdjan		Berdasheer	
*Berdasheer		Velazgherd	
*Velazgherd, &c.			
Mogistan . .	. . . . .	Minau	
Mekran . . .	Gedrosia, with the coast of the Ichthyophagi	Tiz	One or more princes or vali, independent, or nearly so.
*Malan	Country of the Arabitæ and Horitæ	Kieh Pendjpoor Malan	
Seistan . . . (Seghistan)	Drangiane . .	Zareng . . . Farra	The Afghâns, or the king of Caubul.
	Sacastene, (of Isidorus)	Dergasp	
Sabulistan . .	. . . . .	Rokhadje . .	The Afghâns, or
1. Arokhadje	Arachosia	Bamian	the king of
2. Bamian . .	Paropamisadæ,		Caubul.
3. Ghaur . .	(their country)		
Kaubul, or Afghânistan .	Paropamisadæ, (their country)	Caubul . .	The same.
1. Kandahar		Kandahar	(*N. B.* Afghânistan is a name
2. Peria		Peshawer	sometimes applied to the
3. Hasaridjat			whole Afghân
4. Thooran			empire.)

Table of the Nations that inhabit Persia, taken from Manuscript Journals of several French travellers, including Eastern Persia.

I. *Agricultural or manufacturing nations, living in fixed dwellings.*

1. The modern Persians, called Tadjiks or tributaries by the wanderers. Consisting of a mixture of ancient Persians, Tartars, Arabians, and Georgians. Number supposed, at most, 10 millions.
2. The Parsees or Guebres, remains of the Persians of the fifth and sixth centuries, worshippers of fire. At Yezd, &c. In Kerman and Mekran. Number supposed 100,000.
3. The Afghans.
   - *a.* Afghans properly so called. In Kandahar, Cabool, Arrokadje, &c. Number 500,000.
   - *b.* The Balloodjes. See the wandering tribes.
   - *c.* The Rohillas, or Patans. In Indostan.
4. The Ghelaky, or ancient inhabitants of Ghilan. Number 50,000.
5. The Armenians. In Armenia and Adjerbidjan, 70,000.
6. The Jews. At Ispahan, Shiraz, Tehrân, Kashan, 35,000.
7. The Zabians. In Khoosistan, 10 or 12,000.

II. *Wandering tribes, which live by their flocks, or by fishing, changing, or at least liable to change, their abodes.*

1. Tribes of the Turkish language.
   - *a.* The Efshars, 88,000 persons. In Adjerbidjan, and several other provinces. Their nucleus at Oormia. Subdivided into Kasemloo and Erechloo.
   - *b.* The Kadjars, 40,000. (Native tribe of Futteh-Ali-Shah.) Their nucleus at Astrabad in Mazanderan; at Meroo in Khorasan; at Erivan, &c. Subdivided into Jokaru Bashi, and Ashaga Bashi.
   - *c.* The Mukaddem, 5000. At Maraga in Adjerbidjan. A remarkably brave tribe.
   - *d.* The Dombeloo, 12,000. In Armenia; in the neighbourhood of Khoy and of Selmar.
   - *e.* The Turcomans, 12,000. In Adjerbidjan; near Hamadan in Irak; near Kazeroon in Farsistan.
   - *f.* The Talish, 15,000. In Mazanderan and Ghilan.
   - *g.* The Cara-gheusli, 12,000. Near Hamadan.
   - *h.* The Bejat, 20,000. In Adjerbidjan; at Tehran; at Nishaboor, (in Khorasan;) in Farsistan, &c.
   - *i.* The Shasevend, 14,000. Near Ardebil and Rey.
   - *k.* The Djisvanshir, 7000. At Shooshé, in Shirvan, vassals of the Russians.
   - *l.* The Dejelaïr. Number unknown. At Kelat in Khorasan.
   - *m.* The Fars Modanloo; in Farsistan; 10,000.
   - *n.* The Kodjavend; in Ghilan and Mazanderan; 4 or 5000.

   Twenty-eight less considerable tribes, and of which our accounts in detail are uncertain.
2. Tribes of the Arabic language.
   (1.) Arab shepherds introduced by Tamerlane.
   - a. The Bestanié; at Bestan in Khorasan, 12,000.
   - b. The Thooni; in Khorasan; 15,000.
   - c. The Djindaki; in an Oasis of the great salt desert.
   - d. The Agakhani; in Low Farsistan; 15,000.
   - e. The Ahwas; in the plains of Khoosistan.
   - f. The Athullahi, in Kerman; 6000. Three other tribes of 8000 or 9000 each.

   (2.) Arab fishermen, on the sea coast.
   - a. The Beni-Kiab, in Khoosistan, (Elam.)
   - b. The Hindiân Arabs; on the shores of Farsistan.
   - c. The Beni-Hoole; the same.
   - d. The Lindje Arabs, (perhaps from the town of Lundje;) the same.
3. Tribes of the Loorish language.
   - *a.* The Zend, near Ispahan, and in the north part of Farsistan; 12,000.
   - *b.* The Lekes, in Farsistan; 20,000.
   - *c.* The Khogiloo, the same; 15,000.
   - *d.* The Zinguénéh, environs of Kirmanshah; 6000.
   - *e.* The Feili, in Looristan, between Sooster and Kirmanshah; 40,000.
   - *f.* The Baktyari, in Looristan, between Sooster and Ispahan; 30,000.
   - *g.* The Kerroos; environs of Khamsé; from 8 to 10,000.
   - *h.* The Kara-Zendjiri, near Kirmanshah, 7000.
4. Tribes of the Koordish language.
   1. In Koordistan.
      - a. The Mekris; independent, able to muster 3000 horses in one day.
      - b. The Bilbas; independent, scattered; able to raise 15,000 men and 5 or 6000 horses.
      - c. The Giafs; inhabiting the states of Abdul-Ramal, an independent chief; 4 or 5000 families.
      - d. The Goorars; environs of Senney, subject to the valhi or Persian governor.
      - e. The Baras; 1000 families. } Country and political
      - f. The Sunsur; 1200 families. } state the same as
      - g. The Leks; 1000 families. } the Goorars.
      - h. The Kotchanloos; 10,000 persons.
      - i. The Shagagis; 15,000 souls. A peaceful, agricultural, and happy tribe. Distributed also through Adjerbidjan.
   2. Out of Koordistan.
      - a. The Reshevend; in the canton of Taroon, near the defile of Rootbar, between Irak and Mazanderan, 10,000 persons.
      - b. The Pazequi, between Rey and Tehrân, 3000.
      - c. The Zafferanloo; 10,000 persons, in Khorasan.
      - d. The Erdelany; in Khoosistan.
      - e. The Boinoord; in Khorasan; 8000 persons.
      - f. The Modanloo; in Mazanderan; 4000.
      - g. The Embarloo, &c. &c.
5. Tribes of the Patan language.
   - a. The Balloodjes, in Mekran,
   - b. The Hyber,
   - c. The Serwani,
   - d. The Abdolli, and several other tribes, descended of the same stock as the Afghans, and speaking nearly the same language, wandering rather as plunderers than shepherds, or nomades, in the eastern part of Persia.

Note.—In the travelling journals some other tribes are mentioned, such as the Kishlaks in Kersemir and Koordistan; the Seids, who pretend to work miracles, and who live in Adjerbidjan, &c. but those manuscripts which we have had an opportunity of consulting give no further information respecting these tribes.

We expect from M. Joannin, Knight of the Order of the Sun, first interpreter of the French legation in Persia, a complete work on the nomade tribes of Persia. Messrs. Amédée Jaubert, Master of Requests, Fabvier, Trezél, and Treilhier, French officers, have also made various remarks on this new and interesting subject, which was, I believe, first brought into notice in the Travels of Abdul-Kerym, (p. 37 of M. Langlès' translation.) We are also indebted to M. Adrien Dupré for the communication of a very complete table of the nomade tribes

BOOK XXXIV.

CASPIAN SEA.

Geographical Dissertation on this Sea, and the ancient mouth of the river Oxus or Gihon.

FEW subjects in geography have afforded more matter of discussion than the Caspian Sea. The peculiar nature of this sea is one of the most interesting subjects of physical inquiry. Geographical criticism has formed a diversity of conclusions regarding its situation, form, and extent, though there can be no doubt that the sea itself has continued unaltered from the remotest times.

According to the latest astronomical observations and local measurements, the Caspian Sea extends from north to south, in a longitudinal direction, nearly all of equal width, excepting a contraction which occurs at the encroachment made by the peninsula of Apsheron. The northern end forms a large bay, turning round from the north to the north-east, and approaching to the basin of Lake Aral.

The length of the Caspian Sea may be estimated at 760 miles,[a] in a line drawn from north to south, that is, from the bay of Kolpinskom, on the west of the river Ural, to Balfroosh. This line, however, crosses the peninsula of Karagan. Its smallest width is 113,[b] and its greatest width, that is, between Astara and Dahistan, 275 miles.[c]

The situation of this sea, though now well known, was not ascertained a hundred years ago. The ancients laboured under a general mistake that it was a gulph of the Northern Ocean, and this was not corrected till the second century of our era. Ptolemy re-established the fact, which had been known to Herodotus, and perhaps to Aristotle. The Caspian Sea was then restored in the maps to the form of a lake or inland sea, separate on all sides from the northern and every other ocean.[d] But, instead of having its longest diameter in a direction from north to south, it was described as longest from east to west. One reason for this view of it was, that the Northern Ocean was still thought to come much nearer to it than it did, and not to leave room in a northerly direction for the dimensions of this sea, such as were then known. Besides this, the lake Aral being imperfectly known, was considered as a part of the Caspian Sea. This notion is shown to have been entertained, by the opinion which the ancients had of the mouth of the river Oxus, an opinion which will be discussed in the present book.

During the darkness of the middle ages, the editors of maps confined themselves to copying that of Ptolemy. In this the Caspian Sea occupied 20 degrees from east to west; the lake Aral was confounded with it; and the Gihon or Oxus fell into it at the place where the city of Balk is marked in our maps. The first intelligent traveller who substituted actual observations for vague and obscure traditions, was the English merchant, Mr. Jenkinson, who travelled in 1558 and 1561, at the expense of the Russian Mercantile Company of London. Sailing from Astrakan, he visited the northern coast, as far as the mouth of the Yemba; he disembarked at Mangislak, from whence he went to Bokhara. He distinguishes the sea of Aral by the name of the lake of Kithay. In his second journey, he went by Caucasus, to the southern shores of the Caspian Sea. He was succeeded by his countryman Christopher Burrough, who, in 1580, crossed Russia, and embarking at Astrakan, sailed along the western shores of the Caspian, and determined by observation the latitude of several points.[e] In 1633, the learned Olearius, (or Oelschlæger, a native of Aschersleben, and professor at Leipsic,) who accompanied an embassy from the Duke of Holstein to the Sophi of Persia, ascertained the latitude of many points on the western and southern shores of this sea.

The whole of these insulated observations continued almost unknown to the learned of Europe; at least, it would be difficult to produce a French, English, or German map of the 17th century, in which the Caspian Sea has a form in the least degree approaching to the truth. That of John Struys, a Dutchman, undoubtedly the most conspicuous, sets down Astrakan on the eastern shore, and places the islands of the Wolga in the middle of the sea.[f] It was reserved for Russia to find out the truth. The possession of the city of Astrakan, and the extensive schemes of Peter I., created doubts on the form of this sea. Then travels and hydrographic surveys threw additional light on it, till maps were at last constructed which, though rude, exhibited much new truth in the midst of a cloud of error. These maps, prepared from the year 1700 to 1710, by Kirilow, counsellor of state, Admiral Soimonow, and Vice-Admiral Cruys, a Norwegian,[g] are now become very scarce even in Russia. In 1717, Peter I. employed some Dutch navigators to explore the Caspian Sea. These were engaged for three years in preparing a chart under the direction of one Charles Van Verden. The Czar, during his visit to Paris, had frequent con-

[a] "122⅞ myriam. (275 Fr. leagues.)"
[b] "17½ myriam. (41 Fr. leagues.)"
[c] "44¼ myriam. (100 Fr. leagues.)"
[d] The passages of Herodotus, Aristotle, Strabo, Ptolemy, and others, are quoted and discussed in the author's History of Geography, which forms the first volume of the original, though it has been thought advisable in the present translation, to alter in this respect the order of the work, by making the history of this science the concluding part. The English reader has in this way more speedy access to the most essentially interesting branches of the subject.—Tr.
[e] Compare Hakluyt, vol. i. p. 417. Blumenbach, in Zach, iii. 580.
[f] Zeekaert vertonende de Caspische zee, &c., geteekent door Jan Jansen Struys, 1668.
[g] Cruys, ou Creux, born at Stavanger in Norway. Snédorf, Révolutions de l'Europe, dans ses Œuvres completes, part 3, vol. ii. p. 290, (en Danois.)

versations with the learned geographer Delisle,[a] and, at the request of this academician, caused the chart of Van Verden, (to which he had himself given some assistance,) to be sent to the Academy of Sciences of Paris, and likewise that of Vice-Admiral Cruys, neither of which took any notice of the longitudes. On examination, Delisle found them still to labour under glaring mistakes. That of Cruys placed Astrakan on the eastern shore of the Caspian; the same places were laid down twice, at a distance of nearly 300 miles; the latitudes, which at that time might have been easily ascertained within four or five minutes of the truth, were five or six degrees wrong. The chart of Van Verden, or, as it was called, of the Czar Peter, was less erroneous; yet the latitude of Astrabad was three degrees from the truth. The French academician published four different representations of the Caspian Sea, from the data furnished by Ptolemy, by Abulfeda, by Cruys, and by Peter I.; and added to them a new critical sketch, from the observations of Burrough, Jenkinson, and Olearius.[b]

Twenty years elapsed before any attempt was made to improve the geography of these countries. A new company of English merchants then undertook the project of opening an intercourse with India by Astrakan. The celebrated Jonas Hanway, who, in his travels in Persia, has given a history of that enterprise, received in 1745 from Captains Elton and Woodroof a new chart of the Caspian Sea, containing few observations not formerly known. Hanway published another, which, being made out according to the old plan of projection,[c] gives a bad outline. About the same time a German traveller, Dr. Lerche, made some valuable observations on the coast of Daghestan and of Shirwan.

The celebrated d'Anville finding some manuscripts in the royal library, drew from them a new chart,[d] in which the Caspian Sea was removed one degree to the east, but was still two degrees out of its true situation. Twenty years afterwards the hydrographer Bonne contrived a new system for the determination of this great problem. He admitted the correctness of Father Béze's observation on the longitude of Trebisond, though now known to be $7\frac{1}{2}^{\circ}$ wrong, and the incorrectness of which had already been demonstrated by Delisle.[e] Along with this he placed Goriew at the north end of the Caspian, agreeably to the accurate observation of the Russian academician Lowitz.[f] A false observation being thus combined with a true one, Georgia, and the other Caucasian countries, were carried too far to the east by an excessive lengthening of the Black Sea, and occupied what ought to have been the middle of the Caspian, the northern part of which remained in its true situation. Hence, the whole of this sea received an oblique direction from north-west to south-east, and was represented a fifth part more than its real length. D'Anville opposed this system of Bonne, and maintained the true direction of the Caspian Sea.[g]

In the nautical expeditions in which Gmelin and Hablitzl were concerned, all the latitudes, and some longitudes of the eastern and the southern shores, were determined. The observations of these travellers, taken along with the longitude of Casbin ascertained by M. Beauchamp, and compared more recently with the numerous journals of French officers who have returned from Persia, seem at last to have fixed the extent and position of the Caspian Sea. Less easterly, more indented, and more bent than d'Anville has represented, it still has, agreeably to the opinion of that learned geographer and of Peter I., a direction nearly parallel to the meridian.

If the reader will pardon this exposition of the long continued errors and deceptions of mathematical geography, which to those not deeply concerned in such matters may be somewhat dry, it is hoped he will have more pleasure in following us in the description of the physical characters of this singular sea. The level of it is lower than that of the ocean or the Black Sea. Olivier makes a difference of 64 feet. Lowitz, whose researches seem to have been unknown to that learned traveller, makes it only 53.[h] The north and south winds, acquiring strength from the elevation of the shore, added to the facility of their motion along the surface of the water, exercise a powerful influence in varying the level of the water at the opposite extremities. Hence, its variations have a range of from four to eight feet,[i] and powerful currents are generated both with the rising and the subsiding of the winds. Some difference also arises from the melting of the snows swelling the rivers. Of these the Wolga and the Ural or Jaik are the most distinguished on the European side; the Tedjen or Ochus, the Kesil-Ozen, and the Khoor, on that of Asia.

It has also been said to be subject to another variation, which observes very distant periods. We are told that since 1556, the waters of the sea have encroached on the Russian territory to the north. This is a fact which might deserve to be better ascertained. The depth of this sea is inconsiderable, excepting at the southern extremity, where bottom has not been found at a depth of 2400 feet.[k][l]

Pallas and others have indulged in the geological speculation first advanced by Varenius, of the former existence of a much greater extension of this sea to the north-west, and a union of it with the sea of Azof along the low grounds, abounding in shells and saline plants, where the Manytch flows to the sea of Azof, and the Kooma to the Caspian. But of such a communication not the slightest historical trace is to be found in any creditable author. The ideas of the ancient geographers respecting a great extension of this sea to the east, have no relation to this supposed strait. The voyages of the Argonauts would not be at all explained by such a strait, and require no such explanation.[m] The supposition of the Black Sea having stood at a higher

[a] Mem. de l'Acad. des Sciences, p. 382. 1720.
[b] Mem. de l'Acad. 1721. p. 245. Carte de la mer Caspienne, 2 feuilles, 1725.
[c] "Comme les anciennes cartes plates," plane projection.—P.
[d] Essai d'une nouvelle Carte de la mer Caspienne, 1754.
[e] Mem. de l'Acad. des Sciences, 1720, p. 381.
[f] Nova Comment. Acad. Petrop. XIV. 1769, Part II. p. 153.
[g] Mem. de l'Acad. des Sciences, 1774, p. 368.
[h] Georgi, Russie, I. 258.
[i] Hanway's Travels in Persia, I. 289.
[k] "380 toises."
[l] De Sainte-Croix, Examen des Historiens d'Alexandre, p. 701.
[m] The subject is more minutely treated in the author's History of Geography, already referred to.

level, and being separated from the Mediterranean by a continuation of land across the Thracian Bosphorus till that isthmus was ruptured, and a devastating deluge succeeded by the sudden exit of the waters of the Black Sea and of the Caspian, with which it had been previously continuous,—all this hypothetical history is subverted by incontestible physical truths. The valley of the Bosphorus is natural, and not formed by any violent catastrophe. The united waters of the Euxine and Caspian Seas, raised to the height requisite to form such a deluge, would have found an exit by different valleys from those of the Bosphorus.[a] The general deluges described in these early writings, if they had any reality, were probably nothing more than local inundations limited to certain parts of Greece.[b] The stagnant water mentioned by a Byzantine author as existing on the north side of Caucasus in the fourth century, which has been considered as a confirmation of the aqueous connection of the two seas, is nothing else than the lake of Bolcheretzkoi, which still exists.

But what becomes, it may be asked, of all the water which so many rivers pour into the Caspian Sea? Do they flow into two subterraneous communications which connect this sea with the Persian Gulph, and which some early travellers pretend to have seen?[c] Tunnels of this kind have, at all times, been considered by the judicious as purely imaginary.[d] The willow-leaves found in the Persian Gulph do not require to come from Ghilan or any other part of the Caspian, the banks of the Euphrates being sufficient to furnish them. The waters of the Caspian Sea, like those of the Ocean, give off their superfluity by evaporation. This evaporation has been considered as established by the extreme humidity of the atmosphere in Daghistan, Shirwan, Ghilan, and Mazanderân; but no such phenomena as these are required for the demonstration. Every person embued with a slight knowledge of chemistry, knows that, while the air becomes charged with the moisture which it imbibes by evaporation, it continues to appearance dry, that is, it retains a disposition to imbibe more rather than to deposite what it contains, till the impregnation reaches a certain degree of strength, or till a certain degree of cold is communicated to it. The circumstances required for the deposition take place at a considerable height in the atmosphere, and most particularly on the summits of high mountains. The rains and the dews thus formed fill the springs and the rivers, and maintain a constant circulation of the same water travelling from the heights to the seas by the rivers along the surface, and from the seas to the high lands, through the less obvious, but not less certain route of the atmosphere.

The shores of this great Sea are, on the east, formed by steep heights; on the south they are partly skirted with marshy flats; on the west and north by downs of sand.[e] The bottom is strewed with shells, which are partly crumbled, and partly embodied with the rocky strata. Chalk, sandstone, and pyrites, are the prevailing minerals. The shores are obscured, and the mouths of the rivers concealed by prodigious crops of reeds and rushes.

Round the mouths of the rivers the water is fresh, but becomes moderately salt towards the middle of the sea, though less so than that of the ocean. In addition to the usual ingredients of sea-water, it contains a considerable quantity of Glauber's salt.[f] The north-west winds are said to diminish the saltness, and to increase the bitterness of the water. The powerful phosphorescence of the thick muddy waters of the Caspian Sea is remarked by Pallas. The black colour which they assume at a distance from the shore is nothing more than the effect of the depth, and owing to the same optical cause which makes the ocean appear comparatively dark and blue instead of light green, in deep places where the colour of the bottom does not intermix itself with the natural colour of the water.[g] Its northern gulphs are often frozen. The shores are frequented by great numbers of aquatic birds. The sea itself abounds in fish. The sturgeon (*Accipenser sturio*,) is the principal object of its fisheries. From 300,000 to 400,000 are sometimes caught in a year. But for delicate eating the sterlet (*Accipenser ruthenus*) is preferred; and it is from the starred sturgeon (*Accipenser stellatus*, called in the Russian language *sewnige*,) that the best caviare and the strongest isinglas are obtained. A million and a half of these fish, taken in a year, are valued at a million of roubles. (L. 158,330.) There is also the *Accipenser huso*, the *beluga* of the Russians. This fish attains an enormous size, and one is a heavy cart-load for three horses. It is also found in the lake Aral, the Black Sea, the Danube, and in the great rivers of Siberia, as far as the Lena. In one year 100,000 of them have been caught in the Caspian, amounting in value to 340,500 roubles.[h] (L. 53,000.) This sea contains a species of seals not yet well determined. The species of shells and sea plants found in it are not numerous.[i]

The islands of this sea are noticed in the descriptions of the countries to which they belong. Generally speaking, those that have any elevation have no water and no vegetation. The low islands are often mere sandbanks surrounded with reeds. There are very few deep and secure harbours; and as the winds are liable to sudden changes, the navigation is, on the whole, dangerous. Badku[k] is indeed the only harbour in which a vessel can ride with safety in stormy weather.

It would serve little purpose to enumerate all the names which have been given to this sea. That of the Caspian is one of the most ancient, and was probably derived from the word Kasp, a mountain, a name given to Caucasus. This name is not only common to the Greek and Latin languages, but enters into the Georgian, the Armenian, and the Syriac.[l] The Jewish rabbis and Peritsol call it the Dead Sea. The Turkish

[a] Olivier, Voyage en Perse, V. p. 227, &c.

[b] See the account of Greece, in a subsequent volume of this work.

[c] Struy's Travels, p. 126, (German edition of 1678.) P. Avril, Voyages en divers etats d'Europe et d'Asie, p. 73.

[d] Kæmpfer, Amœnit. Exot. p. 254.

[e] The shores of the Caspian are low, flat, and overgrown with reeds, on the N. from the Terek to the E. extremity of the bay of Mertvoi Kultyuk, nearly opposite. The rest of the shores are generally bold, and the water deep, except around the bay of Balkan, on the S. E *Ed. Encyc.*—P.

[f] Gmelin, Voyage III. 261—267.

[g] Kæmpfer, Amœnit. Exot. p. 259. Compare Petreius, Chronic Folio 120.

[h] Georgi, Description de la Russie, part iii. p. 1902, &c. 1969, &c.

[i] Gmelin, Voyage, III. 233—257.

[k] Baku.

[l] Wahl, Asien. I. 679, &c.

denomination for it, Khoosgoon Denghizi, is variously translated, but no probable etymology is assigned. The Byzantines and the Arabians call it the Sea of the Khozars or Chazars, after a powerful nation; and the Russian annalists knew it in the tenth century under the name of *Gualenskoie*, or *Shwalenskoie-More*, after the Shwalis, a Slavonian people, not much known, that lived on the Wolga.[a] In the maps of the middle age, the name Mar di Sala is applied to it, which the learned Wahl translates Sea of Salt; but it is perhaps rather derived from the town of Sara, or Saray, the capital of Kaptchak, which in some maps is called Sala. There would be no end to the enumeration of names taken from adjacent provinces, such as the Hyrcanian Sea, and many others. The name given to it in the Zenda-Vesta is, however, worthy of remark. That apocryphal work, which is full of old traditions, calls this sea *Tchekaêt Daêti*, or the "great water of judgment." Perhaps Noah's flood, so famous in the traditions of the East, might have had a connection with a sinking of the earth, which had destroyed the inhabitants of an extensive country, and converted it into this remarkable sea.

Having thus traced the geographical history of the Caspian Sea, let us take some notice of a discussion naturally attached to it. This consists in a question famous in the annals of Geography: Did the river Oxus or Gihon once flow into this sea?

Those readers who peruse the works of the Greek and Roman geographers in a superficial manner, will perceive a considerable unanimity among them on the course and termination of the Oxus. It is described as running from east to west, and falling into the Caspian Sea. This is what Strabo and Pliny suppose to be the fact, and what Ptolemy expressly asserts. But there are various circumstances which divest this unanimity among authors of its imposing character. In the first place, the extension which these geographers give to the Caspian Sea in an easterly direction, and their silence with regard to the lake Aral, lead us to believe that they considered that lake as a part of the Caspian Sea, and that, in speaking of the junction of the Oxus with the Caspian Sea, they meant by the latter the lake Aral. This will appear evident to any person, who, with a map before him, reads that passage of Strabo, in which, after describing the Oxus and the Ochus, he affirms that the Iaxartes (the modern Syr-Daria) also flowed into the Caspian: a termination which the course of that river rendered at all times impossible.[b] Another of the ancient writers, Pomponius Mela, gives a description of the Oxus quite conformable to the present geography of the surrounding places. Instead of merely saying that its course is from east to west, (a mode of description which has led so many to conceive that time has altered its direction,) he says that, after running westward, it takes a northerly direction, and falls into the Scythian Gulph.[c] From this account, it must then, as it does now, have fallen into the lake Aral, which was considered by the authors whom Mela followed as a gulph of the northern or Scythian ocean. The order in which the Oxus is named along with other rivers by Dionysius Periegetes, shows that, though he makes it run into the Caspian Sea, he places its mouth in Sogdiana or Chorasmia, and not in the country of the Derbices, who lived near the bay of Balkan on the Caspian Sea,[d] showing that he was acquainted with the northerly course of this river.

A very important passage of Patroclus, quoted by Strabo, proves more clearly that the mouth of the Oxus was exactly in the same situation as it is now. "Some say that the Ochus[e] runs through Bactriana, others make it run along the frontier of that country. The latter consider it as distinct from the Oxus to its termination, and lying farther south, although both fall into the sea in Hyrcania. The former, allowing that these rivers are different in their origin, maintain that they join, and that the bed of the Oxus is often six or seven stadia in breadth. It is at least certain that the Iaxartes is, from its rise to its mouth, different from the Oxus, although it runs into the same sea.[f] Patroclus says that their mouths are about eighty farsangs distant from each other; but the Persian farsang is with some sixty stadia, with some thirty, and with others forty."

When we measure with a pair of compasses the present distance between the most southerly mouth of the Iaxartes or Syr-Daria, and the most easterly of the Oxus or Gihon, we find it 2 degrees 20 minutes, equivalent to 2592 stadia, (allowing $1111\frac{1}{9}$ stadia to a degree.) Taking the farsang at thirty stadia, the distance according to Patroclus would be 2400 stadia, which is precisely the number given by Eratosthenes, quoted by Strabo a little before. Thus the ancient and modern distances nearly agree. This correspondence will appear the more surprising, if we examine the distance taken along the shores of the lake Aral. It is found to be 3320 stadia, or eighty-three farsangs of forty stadia. Finally, if we take for our points the most westerly mouth of the Gihon, and the most northerly of the Syr-Daria, we shall have eighty-two farsangs of sixty stadia. Thus the three marks given by Patroclus, or rather by the Persians whom he had consulted, concur to show that the mouths of the Oxus and Iaxartes were at the same distance as at present, consequently both emptied themselves into the lake Aral.

Thus it appears that the Greeks and Romans had no positive notions of their own respecting the mouth of the Oxus. But the traditions which they had collected, and some geographical data which they had obtained, give us every reason to conclude that this river had always the same course and termination as now.

The Orientals undoubtedly furnish some information to those who can peruse their works in the original languages. Ibn-Haukal, and after him Abulfeda, describe

[a] Busching, Magazin, vol. XVI. p. 287—348.

[b] "Ὁ Ιαξάρτης εκπίδωσι τε δμοιως (Οξῳ και Οχῳ) εις το Κασπιον." lib. xi.

[c] "Iaxartes et Oxos per deserta Scythiæ ex Sogdianorum regionibus in Scythicum exeunt. Hic, aliquandiu ad occasum ab oriente currens juxta Dahas primum inflectitur cursuque ad septentrionem inter Amardos et Pæsicas os aperit."

[d] Dion. Perieg. v. 747.

[e] The Tedjen.

[f] Pliny, lib. vi. c. 13, in giving the same passage of Eratosthenes, says, "Ad ostium Zoni fluminis quatuor MDCC stad. Ab eo ad ostium Iaxartis MCCC. Quæ summa efficit quindecies centena LXXV millia." The passage is certainly corrupted. It has been proposed to read 2400 stadia for the distance between the Zonus and Iaxartes. The name Zonus is somewhat curious. It is a corruption of Zihon, the name which the people of the east have always given to the river Oxus

the course of the Gihon, agreeably to our modern maps, as terminating in the lake of Khowarezm, which we call the sea or lake of Aral. Abulfeda quotes, but without acquiescing in its truth, the assertion of Rasmol Mamoori, according to which one branch of the Gihon should run into the Green Sea,[a] that is, the Persian Gulph. The Turkish geographer, Hadgi-Khalfah, says, after Hamdoulah a Persian geographer, that an arm of the Oxus takes a direction towards the Caspian Sea, crossing in a rapid stream the valley of Kherlava. The traveller Abdoul Kerym, who visited these places between 1730 and 1740, affirms that the Gihon, "far from reaching Mazanderan, (Hyrcania,) as some authors had said, did not even reach the lake Khowarezm, being entirely expended by frequent outlets for the irrigation of the fields."[b]

The European travellers of the 16th and 17th centuries appear not to have observed the facts with their own eyes, but through the distorting medium of Ptolemy, otherwise they could not have fallen into so many contradictions. Hanway, Bruce, and Jenkinson, pretended to have found a dried arm of the Oxus, but which had at a former period conveyed its waters, or at least a part of them, to the Caspian Sea. But one of these gentlemen, Bruce, makes the mouth of this branch near Sellisoure, in 42° 30′ of latitude, while another places it in the great bay of Balkan, in 39°. The large Russian Atlas, lately published, fixes it in this last situation.[c] Nor is there any agreement about the situation where this arm of the river separates from the present line. Some place it at Hazarasp, others at Vazirkend, while some go as far down as Urghenz. Add to this, that the epoch of the supposed stopping of this branch by the Tartars is an equal subject of uncertainty, and of contradictory assertions. The Arabian writers whom we have just mentioned, do not admit any modern change of this kind. It must have been prior to Ibn-Haukal, in the 10th century. Yet the Russians say that it took place about the year 1719, and was intended to present an obstruction to the progress of their arms.

The following memorable transactions were the consequences of this belief, so firmly maintained by that nation.[d] Peter the Great had received some accounts of gold being contained in the sands of the Kisil-Daria, a river which falls into the Gihon from the east, and is sometimes confounded with the latter. He resolved to take possession of a country where he hoped to find mines of wealth, and through which he might also open a commercial communication with India. Navigators were sent to find out the mouth of the Kisil-Daria, which was supposed to run into the Caspian. A river was found, perhaps the Tedjen, which was taken for the Kisil-Daria. The learned decided that it was the Oxus, and an expedition was resolved on and prepared. Alexander Beckewitz, son of a Circassian prince, captain of the Czar's guard, acquainted with the Tartar language, had a body of 3000 men placed under his command, to proceed to the pretended mouths of the Kisil-Daria, and to take possession of the adjacent countries. The Tartars, uneasy at seeing the Russians making so many visits to this place, had, it is said, turned aside the course of the river, by damming it up with a strong dyke, and conducting the water in three canals to lake Aral. Beckewitz arrived with his army, and searched in vain for the river by which he hoped to ascend to Khiwa. He was not disconcerted by this disappointment; he constructed a fort of limestone, on Cape Karaganskoi, and then advanced with his troops against Khiwa. The khan met him with a numerous army, but was soon defeated by means of the European artillery. Mortified and rendered desperate by this defeat, the khan sent to inquire of the Russian general what were the complaints of Russia, and what sacrifices were required of him. Beckewitz, full of the notion of the artificial change of direction which had been given to the Kisil-Daria, demands of the khan that he should open the dyke which prevented the river from running into the Caspian Sea, and thus restore it to its old course. The Tartar prince replied, that this operation was beyond his power, and that it was impossible to close up the channels in which the river followed its new direction. Beckewitz then proposed to execute the project with his own men, provided their safety were insured by the delivery of hostages. To this proposal the Tartars willingly agreed, and the hostages were given. These, at the same time, acted as guides to the Russian army, which marched five days towards the supposed dry bed of the river. In every quarter they met with nothing but small puddles of stagnant water. The soldiers were exhausted with thirst. The guides, with the most perfidious intentions, proposed to the Russians that they should divide themselves into small parties, and go in different directions. The Russian commander was under the necessity of following the advice of his enemies. The small Russian army was no sooner dispersed in these unknown deserts, than the Tartars, who had watched them, attacked their feeble detachments on all sides. Some were put to the sword, and the rest reduced to slavery. The unfortunate Beckewitz was taken into the presence of the khan, and hacked to pieces. His skin was dried, and made into the cover of a drum, which was preserved at Khiwa as a trophy, to testify to posterity the disastrous issue of an expedition so ignorantly planned, and conducted with so little prudence. The news of these tragical events were taken to Russia by the soldiers who had been left in the fort of Karaganskoi, and saved themselves on board the vessels which had brought them.

There is nothing in these transactions to justify any change of opinion about the ancient course of the Oxus. It is not probable that a weak Tartar nation had either any adequate motive for changing the course of the river, or the means of effecting an operation of such prodigious labour. But they had sufficiently strong motives for allowing the Russians to persevere in their mistaken ideas and vain researches.

If the question were considered as deserving of further research, precision would be best attained by means of

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[a] Abulfeda Reiskii, ap. Busching, Magas. Geogr. iv. 169. Ibn-Haukal, Oriental Geography, by Ouseley, p. 241, &c. 265.

[b] Collection des Voyages, par M. Langlès, i. p. 55, &c.

[c] "In the little gulph of Balkan."

[d] Muller, Samlung Russischer geschichten. vol. vii.

a well-informed person travelling by land, with a barometer in his hand, from Guriew to Astrabad, along the east side of the Caspian Sea. The Russian maps lay down a series of sandy valleys between the present course of the Oxus and the Caspian. But we have no satisfactory account of the authorities on which these delineations are founded. Georgi, in his description of Russia, and Gmelin in his travels, represent this country as occupied by a chain of mountains reaching from the steppe of the Kirghis to Astrabad, separating at every point the basin of the lake Aral from that of the Caspian Sea.

BOOK XXXV.[a]

AFGHANISTAN.

The country comprehended under this name is generally considered as a part of Persia, and distinguished by the appellation of Eastern Persia; but both in its physical, civil, and political character, it is entitled to a separate description. At present it forms an independent kingdom, and holds in subjection some surrounding countries belonging at other times to Persia, Independent Tartary, (or Turkestan,) and India.

It goes under the names of the kingdom of Caubul from the capital, sometimes Caubulistan, sometimes the kingdom of Kandahar, from another capital. In former times it was denominated the kingdom of Ghuznee, or Ghiznee, from another city, for a similar reason.

This kingdom varies in its boundaries, being in itself unsettled, and thus prevented from exerting its natural strength in retaining some of its most remote dependencies. At present its utmost extent is from the west of Herat, in east long. 62°, to the eastern boundary of Cashmere, in long. 77°, and from the mouth of the Indus in north lat. 24°, to the upper part of the Oxus in lat. 37°. In these countries the Khootba or church-service is used in which the king of the Afghans is prayed for, although the degrees of subjection of the different localities are various. The empire comprehends Afghanistan properly so called, Seistan, part of Khorasan, and of Mekrân, Balk, Kuttore, Kandahar, Sind and Cashmere, together with a portion of Lahore, and the greater part of Mooltan.

The whole population is estimated at fourteen millions, consisting of the following nations:

Afghans[b] - - - - - -	4,300,000
Belooches - - - - - -	1,000,000
Tartars - - - - - -	1,200,000
Persians (including Taujiks) - -	1,500,000
Indians of different races - -	5,700,000
Miscellaneous tribes - - -	300,000

On the north it is bounded by the range of Hindoo Coosh, or Hindoo Coh, *i. e.* the Indian Caucasus, separating it from Independent Tartary, but on the western part of the line it extends beyond this range to the territory of Balk. This chain is a continuation of the Himmaleh mountains on the east, which at Cashmere lose the name of Himmaleh, and take that of Hindoo Coosh, from a peak in the neighbourhood of Caubul, to which that appellation more strictly belongs. The range is perpetually covered with snow, as far west as the peak; beyond this the height diminishes, and the snow is melted in summer. That part of the chain is called Paropamisus. From the place where the Indus issues from Hindoo Coosh, in latitude 35°, and longitude 73°, this river passes through mountains to latitude 33°. After this it has a plain on each side, all the way to the sea; but at a little distance to the west of this river, the mountain range of Solimân extends as far south as latitude 29°. This range sends three branches to the east. The most northerly of these is called the range of 34°, from its latitude at its point of detachment; another is called the Salt range, being chiefly composed of rock salt; both of these extend considerably to the east of the Indus, into that part of India called the Punjaub. The third does not reach that river.

From the southern termination of the Solimân range, a chain of hills runs nearly west to the table-land of Kelât. On the south-west it has lower hills included in Mekrân. If a line is drawn from the south end of the Solimân chain to Herât, at the western extremity, we shall, with the Hindoo Coosh mountains, and a line parallel to the Indus on the west, form a triangle, which comprehends the greater part of the mountainous country of Afghanistân. The first line will be more correct, if, instead of being straight, it has a convexity to the south-west. The hills here included vary in their direction and elevation. All the considerable ones have snow lying on them during part of the year, and are generally separated by fertile valleys. Between the Hindoo Coosh and the valley of the Caubul river, there are three parallel ranges of mountains successively lower, and passing under different local names, some of them very precipitous, and inhabited by different tribes, or subdivisions of tribes. In the eastern part, the hills on the two sides of that river approximate; and the river runs among hills and rocks. Different valleys on the left and right, that is, the west and east, open into that of the Caubul. That part of this country, including hills and valleys which lie on the north of the Caubul river, is called Cohistân. To the west of Cohistân is the Paropamisan chain, which is less lofty, but intricate and little known in its minute topography, from being difficult of access. Its eastern part, inhabited by the Hazaureh tribes, is cold and rugged; the western, inhabited by the Eimâks, is somewhat better cultivated, and has wider valleys, but still poor and wild.

Opposite to a southerly projection and high peak of the Hindoo Coosh range called Coond, and on the south of the Caubul river, is a high peak, called Suffaid Coh, which is a sort of centre from which different ranges of mountains extend, chiefly belonging to the Solimân chain; the descent from which to the Indus on the east, is steep and sudden. On the west it is also sudden, but less considerable, the land itself being higher.

[a] This book is not contained in the French original; but has been entirely added by the English translator, chiefly extracted from Elphinstone's Caubul.—P.

[b] The reader will remark the great difference between this estimate, and that which is given in the author's Table at p. 315, which proceeded on authority far inferior to that of Mr. Elphinstone's work on the kingdom of Caubul, from which the greater part of the present book is taken.—Tr.

The Soliman range consists of a hard black stone at its highest part; next a hard red stone; then a friable gray sand stone.[a] The branches running west from this range are more intricate and less known than the easterly ones already mentioned. Different ranges extend from the northwest of the plateau of Kelât to the east, some inclining northerly, and others a little to the south.

The Indus is the most conspicuous river connected with Afghanistan. A great proportion of the water which falls on that country, flows in different streams from the west into this great river; and the Indus is almost entirely more or less under the Afghan dominion after it crosses the great mountain range in which it divides Himaleh from Hindoo Coosh. The Abba Seen and the Booringdoo, proceeding from the Hindoo Coosh, and running in general a southerly course, flow into the Indus on the west side. Kaushkhaur River is another which, like the Indus, rises a great way north of the same range, and flows strait south parallel to the Beloot-Tagh range; passes the Coond with great violence on the east, and falls into the Caubul. Higher up, the river Caubul receives various other tributaries from the valleys, and carries all their waters finally into the Indus, a little above Attock. Lower down, the Indus receives several small streams from the west, then the Kooroom, and, farther south, the Gomul, the waters of which, however, though its course is long, are chiefly expended in irrigating the land of Damaun along the eastern base of the Soliman range. The greatest of the rivers which water the west of Afghanistân is the Helmund or Etymander, called in some maps the Hendmind. It runs 200 miles through the Paropamisan range; then issues into the cultivated plains of the Dooránee territory; soon enters a sandy desert, and terminates in the lake of Seistan. Its course is generally west by south. Every where within half a mile or a mile, its banks are cultivated and fertile. Its stream is considerable, though forded for the greater part of the year through almost the whole of its course. In the dry season, it is breast deep where it leaves the mountains, and at the time of the melting of the snows is deep and rapid. It receives some very important tributaries, chiefly on its left or south side, viz. the Urghundaub, near which is the city of Kandahar; the Turuk, and the Shorundân, which join the Urghundaub. On the north side, it receives the Khaushrood. Farther west is the Furra-rood, 200 miles long, which appears to flow directly into the lake, or to be lost in the sands. The Oxus rises within the subjugated territory of Balk, before it crosses Independent Tartary to fall into the lake Aral.

The lower part of the plain of the Indus is called the Sind, or Lower Sind. It is subject to a native prince, who is tributary to the king of Caubul. From Shikarpoor to Sungur, it is called Upper Sind, which is more directly under his government. Above Sungur is Damaun, a name which is sometimes limited to the skirts of the hills; at other times includes the plain inhabited by various tribes. At the upper part of the Indus, within the Afghan territory, is the country of the tribe called Yoosofzyes. The plain of Peshawer occupies the open part of the banks of the Caubul river, not far from its mouth, but divided from it by the mountains of the last mentioned tribe. The northern hills by which this plain is bounded are covered with pines. On the right bank of the river, which does not, like the left, belong to Cohistan, is, first, the country of the Kheyberees, a very predatory tribe; and farther west, the rich plain of Jellallabad. To the west of the plain of Peshawer, is that of Caubul, the north side of which is in Cohistan; the south part of it is spoken of as a most enchanting country. Here is Ghiznee, or the country of the Wurduk tribe, containing one of the ancient capitals; and farther south, is the lake Abistandeh, which has no outlet, but, receiving various rivers, forms a basin peculiar to itself. To the south of this, and somewhat to the west, are the valleys of the Turnuk and the Urghessaun: the former is 60 miles broad, and tolerably fertile; the latter generally poor, though very rich in the immediate vicinity of Kandahar. The upper part of both valleys is inhabited by the Ghiljie tribes; the remaining and most extensive part, from Kelâti-Ghiljie to Herât, by the Dooranees,—the tribe considered as at present the ruling one, as the king of Caubul belongs to it. It is the largest tribe of the Afghans. To the south of all this tract, are the valleys opening on the river Gomul, and the intervening mountains. Sirufza, Oorghoon, and Wauneh, are the valleys descending in stages to the Gomul, which bounds them on the south. From the south side, the valleys of Pisheen, Burshore, and Zhobe, connect themselves with the Gomul. Many other subordinate districts diversify the face of this unequal country.

The north-eastern part of Afghanistan participates in the Indian monsoons or rainy season, but greatly modified and very distinct from that incessant and drenching rain which prevails in the southern parts of India, where the precipitation of the moisture begins on the ocean, and extends interiorly, gradually losing its decided character. The monsoon commences on the Malabar coast in May, and reaches Delhi by the end of June. It prevails more among the mountains than in the flats of the eastern tributaries of the Indus, called the Punjaub. The hills and valleys of Cashmere have their share of the rains. They diminish as they go west, and in the valley of Peshawer the monsoon only appears in some clouds and showers. In the valley of Caubul it does not extend beyond Lughman, but, in the southerly projection of Hindoo Coosh, called the Coond, it forms the principal rains of the year. In the south of Afghanistan the influence of the monsoon is felt as far west as the western boundary of Mekrân. There are other rains or snows which fall about Christmas, which, in the greater part of the country, are of more importance to husbandry, especially that portion which is in the form of snow. The rains, strictly so called, are less important than those of spring, which are said to come from the west. The climate varies greatly in different parts. Mr. Elphinstone found that of the plain of Peshawer in February, where the mission from India arrived in 1809, to be cold in the night, but agreeable during the day. There was frequent hoar-frost as late as the 8th of March, but by the middle of the month the sun was disagreeably hot as early as eight in the morn-

[a] Probably trapp, slaty clay, and sandstone; a common order of succession in the trapp and sandstone formations.—P.

ing. The approach of spring was very rapid. Some violent hot winds blew in June, at least in the countries adjoining on the east, where the mission had now gone. The cold even of winter is not very severe, and some of the Indian plants are in leaf all the year. At Caubul and Kandahar the summers are cooler, and the inhabitants exclaim against the heat of Peshawer. The inequality of the elevation is accompanied throughout with a corresponding inequality of climate. The winter of Damaun, on the west of the Indus, is agreeable, being colder than in any part of Indostan. But the summer is insupportably hot. In the higher table land on the south, as Pisheen and the west part of the Caukir country, it is cool, and in winter thin films of ice are formed on water in the night. Kandahar has a hot climate. No snow falls there in winter, and the little ice that is formed on the edges of streams melts before midday. The samoom winds are not unknown in that quarter. To the north and to the east of Kandahar the cold increases. At Ghiznee, which is the coldest part of the plain country in the Afghan dominions, the severity of the temperature is sometimes excessive; and there are traditions of that city having been twice destroyed by falls of snow in which all the inhabitants were buried. The prevailing winds of Afghanistan are from the west.

Of animals, the lion is very rare, though common both in Persia and in the adjoining parts of India. Tigers and leopards are common to the east of the Soliman range, and the former are found in all parts of the kingdom. Wolves abound every where, and forming into troops, are formidable to cattle, and sometimes to men. Hyænas, jackalls, foxes, and hares, are also abundant. The bears are common in the woody mountains, but seldom quit their haunts except when tempted by sugar-cane plantations. Wild boars are rare, though common in Persia and India. The wild ass is confined to the Dooranee country, in the basin of the Helmund. Wild sheep and goats are common in the eastern hills. There are also porcupines, hedge-hogs, and monkies, the last only in the north-east parts. Moles are only found in Cashmere. The king has a few elephants, but they are brought from India. The breed of horses is generally indifferent, the best that are used in the country being brought from India, but some excellent ones are bred at Herat and Balk. Dromedaries are the principal beasts of burden. The Bactrian camel is comparatively rare. Buffalos, though rather rare, are found in many parts. The ox is every where used for ploughing except in Balk. It has a hump like that of India. No herds of oxen are kept except round the lake Seistan. The live stock of the pastoral tribes consists chiefly of sheep of the Persian kind, called Doomba, distinguished by their broad flat tails composed of fat. Goats are very common, and some breeds have long and curiously twisted horns. There are excellent grey-hounds and pointers, exactly resembling those of England. There are two or three sorts of eagles, and many kinds of hawks, some of which are used in falconry. Herons, cranes, storks, wild ducks, geese, swans, partridges, quails, and other winged game, are in great abundance. The serpents are mostly harmless; there are no crocodiles; turtles and tortoises are common. Flights of locusts have been known to occasion famines, but they are rare. Bees abound, but are only domesticated in Cashmere.

Most of our European trees are found everywhere. Few species peculiar to India grow to the east of the Soliman range, and none to the west. Pines are the most common species in the mountains, one of which, called the Jelgoozeh, is remarkable for cones larger than artichokes, and containing seeds like pistachio nuts. Two kinds of oaks, cedars, a gigantic cypress, walnuts, and wild olives, are among the natives of the mountains. Birch, holly, and hazel, are known, also the mastic and the pistachio tree, in the mountains. The mulberry, the tamarisk, and the willow, are the most common wild trees in the plains. The barberry, and other berry-bearing bushes, are common, and a plant called Arghawaun, which is a sort of *anemone*, but so tall as to be almost entitled to the appellation of a tree. Roses, jessamines, poppies, narcissuses, hyacinths, tuberoses, stock, and others of our common flowers, are cultivated in gardens, and many of them grow wild. Gold is only found in the streams which flow from the Hindoo Coosh. Silver is found in small quantities in the country of the Caufirs, north of that range. There are mines of lead and antimony in the Paropamisus, and of lead in the southern mountains, bordering on Beloochistan.

The character of the Afghân nation differs from that of all their Asiatic neighbours, being distinguished by a manly spirit of independence. In order to give a picture of the nation in a manner both striking and impartial, Mr. Elphinstone exhibits them in two points of view; first, as they would appear to a person transported to them from England, without having had his habits of feeling at all modified by the intervention of Turkey, Persia, or Tartary, and then as they appear to an Englishman directly from India. The former would discover a wild assemblage of hills and wastes, unmarked by inclosures, and destitute of all the elaborate productions of human industry and refinement. He would find the towns few, and far distant from each other, and would look in vain for inns and other conveniences which a traveller would meet with in the wildest parts of Britain. Yet he would be delighted with the fertility and populousness of particular plains and valleys, where he would see the productions of Europe mingled in profusion with those of the torrid zone, and the land laboured with an industry and a judgment nowhere surpassed. He would see the inhabitants following their flocks in tents, or assembled in villages, to which the terraced roofs and mud walls would give an appearance entirely new. He would be struck at first with the high and somewhat harsh features of the people, their sunburned countenances, their long beards, loose garments, and shaggy mantles of skins. He would notice the absence of courts of justice, and an organized police. He would be surprised at the fluctuation and instability of the civil institutions. He would find it difficult to comprehend how a native could subsist in such disorder, and would pity those who were compelled to pass their days in such a scene, and whose minds were trained by their unhappy situation to fraud and violence, rapine, deceit, and revenge. Yet he would scarcely fail to admire their martial and lofty spirit, their hospitality,

and their bold and simple manners, equally removed from the suppleness of a citizen, and the awkward rusticity of a clown; and would probably, before long, discover among so many qualities that excited his disgust, the rudiments of many virtues.

But an English traveller from India would view them with a more favourable eye. He would be pleased with the cold climate, elevated by the wild and novel scenery, and delighted by meeting with many of the productions of his native land. He would first be struck with the thinness of the fixed population, and then with the appearance of the people; not fluttering, like the Indians, in white muslins, while half their bodies are naked, but soberly and decently attired in dark-coloured woollen clothes, and wrapt up in brown mantles, or large sheep-skin cloaks. He would admire their strong and active forms, fair complexions, and European features; their industry and enterprise; the hospitality, sobriety, and contempt of pleasure, which appear in all their habits; and, above all, the energy and independence of their character. In India, he would have left a country where every movement originates in the government or its agents, and where the people absolutely go for nothing; and he would now find himself among a nation where the control of the government is scarcely felt, and where every man appears to pursue his own inclinations, undirected and unrestrained. Amidst the stormy independence of this mode of life, he would regret the ease and security in which the state of India, and even the indolence and timidity of its inhabitants, enable most parts of that country to repose. He would meet with many productions of art and nature, which do not exist in India; but, in general, he would find the arts of life less advanced, and many of the luxuries of Indostan unknown. His impression of his new acquaintances would be on the whole favourable; although he would feel that, without having lost the ruggedness of a barbarous nation, they were tainted with the vices common to all Asiatics. Yet he would reckon them virtuous compared with the people to whom he had been accustomed; would be inclined to regard them with interest and kindness, and could scarcely deny them a portion of his esteem. Both these descriptions of travellers, when they began to investigate their political constitution, would be alike perplexed with its apparent inconsistencies and contradictions, and with the union which it exhibits of turbulent independence and gross oppression. But the former would perhaps be most struck with the despotic pretensions of the general government; and the latter, with the democratic licence which prevails in the government of the tribes.

The origin of the name Afghan is uncertain. It is only through the Persian that it is known to the people themselves; and it is probably modern. Their own name for their nation is Pooshtoon, in the plural Pooshtanneh, pronounced Pooktauneh by the Berdooranee tribes, whence probably the name Patan, by which they are known in India. They were very early in possession of the Solimân mountains, and, in the ninth century, of those which form the north-east part of their present territory. During the government of the descendants of Genghiz and of Tamerlane, they retained their independence, when Bauber came among them, and, beginning his career by the conquest of Caubul, laid the foundation of the Mogul empire, which after his death was transferred to Delhi. In the beginning of the 18th century, the Afghân tribe of the Ghiljie founded an empire which included all Persia. This was overthrown by Nadir Shah, who annexed the greater part of Afghanistân to Persia. On his death, the present monarchy was founded. The Afghâns consider themselves as descended from Afghaun, the son of Irmia or Berkia, son of Saul king of Israel; and their national histories begin with relating the transactions of the Jews from Abraham down to the captivity. This part of their history agrees with that given by other Mahometans, and differs but little from that of Scripture, only that it is interspersed with some wild fables. After the captivity, they allege that a part of the children of Afghân withdrew to the mountains of Ghore, or Gaoor, (Paropamisus,) and part to the neighbourhood of Mecca in Arabia. All this, however, rests on vague tradition. Their race always preserved the knowledge of the unity of God; and on the appearance of Mahomet his greatest prophet, obeyed his invitation, and marched to the aid of the true faith, under Kyse, afterwards surnamed Abdoolreshid. The Arabian historians, however, give no countenance to any part of this narrative. The Afghân historians themselves furnish proofs of their inaccuracy, by making Saul the forty-fifth in descent from Abraham, which is inconsistent with the sacred writings, and Kyse only the thirty-seventh from Abraham, in a period of 1600 years.

The Afghâns have many subdivisions of tribes, and numerous chiefs called Khauns; their attachments are rather to their clan and the public good, than to the chief. He presides in the Jeergas, or deliberative councils of his tribe or clan. In the administration of justice, the Mahometan law is adhered to, but private revenge is much practised and countenanced by general usage, although the Moollahs, or ministers of religion, who assist at the regular tribunals, declaim against it. The king is the natural head of the Dooranee tribe, the greatest, bravest, and most civilized of the whole; he levies fixed proportions of troops, or money, or both, from each tribe, for the common defence. The whole nation, however, is seldom unanimous on any general plan of movements, the particular interest of each *oolooss*, or tribe, occupying its chief attention. The king's authority is greater over the plains, and about towns, principally inhabited by a class of people called Taujiks, who are not considered as of Afghân descent, and are not numbered among the tribes. The foreign provinces are also under greater subjection; and from these quarters he is enabled to raise a revenue and maintain an army independent of the tribes. There are some points of strong resemblance between the situation of the Afghân country and that of Scotland in former times; the clans nearest to the royal residence yield a precarious submission, while the remote ones are independent; and the nobility most connected with the court are powerful and factious. The only point of difference is, that the Scottish chiefs were despotic, while the Afghân tribes are generally under a republican government. The king appoints some judges

under the name of Cauzees, who share with the jeergas of the tribes in the administration of justice, although without any concert or mutual connection.

The Afghâns purchase their wives; consequently women, though generally well treated, are in some measure considered as property. Courtships are conducted through the medium of the relations of the parties; and the marriage contract is drawn up by the Cauzee. In the country, the women generally go unveiled, the intercourse between the sexes is less distant, and marriages more frequently originate in the attachment of the parties. The women of the upper classes are completely secluded, but have all the comforts and luxuries provided for them that can be afforded. Those of the poor do the work of the house, but they do not engage indiscriminately in the labours of the men, like the Indian women, who even labour among masons and bricklayers. The sentiment of love in all its fervour and fidelity is frequent among the Afghâns. Besides numerous elopements, it is common for a man to plight his faith to a particular girl, and then set off to a remote town, or to India, to acquire the money which must be paid to obtain her from her friends, and which, however favourably disposed, they cannot in honour dispense with. Many of the Afghân songs and tales relate to love.

The Mollahs, or officers of religion, are the regular instructors of the youth. Some learn no more than their set forms of prayer, and other ceremonies of their religion, with some passages of the Koran. The next step is to learn Arabic, or at least to read the Koran, but often without understanding it. There is a teacher in every village or camp, who is maintained by certain allotments of land. In towns, there are regular schools, in which the teacher is maintained by his scholars alone. People of decent fortune learn the Persian classics, and Arabic grammar. This last is taught in a very complicated manner, involving many other subjects, and sometimes occupies several years. A young Mollah, when sufficiently proficient in this study, goes to Peshawer, Hushtnuggur, or some other place famous for its Mollahs, and enters on logic, law, and theology. Some push their researches into ethics, metaphysics, and the system of natural philosophy known in the east, as well as history, poetry, and medicine, which last is a fashionable study for men of all professions. These often travel to distant places, and even to Bokhara, which is a great seat of Mahometan learning; but Peshawer seems, on the whole, to be the most learned city in these countries, and many more students come thither from Bokhara, than repair to that city from Peshawer. India has, in this respect, no great reputation, and Persia is avoided on account of the religious heresy of Sheeism, which is professed in that country, the Afghâns being orthodox Sonnites. The language of the Afghâns is called Pushtoo; its origin has not been well investigated, and probably is not easily discovered. Of a large proportion of the words composing it, the roots are unknown; yet some of the words which must have been used in the earliest stages of society, or others by which they have been supplanted, belong to the Zend and Pehlewé, such as the terms for father and mother, sister and brother, and the numerals. The words connected with religion, government, and science, are mostly introduced from the Arabic, through the Persian. The Afghâns use the Persian alphabet, and generally write in the Nushk character. Having some sounds which are not represented by any Persian letters, they express them by adding particular points, or other marks, to the Persian letters which come nearest to them. The language is rough but manly, and not unpleasing to an ear accustomed to oriental tongues. None of the Pushtoo authors of celebrity are more than a century and a half old, and probably none at all more than three centuries. They have many translations from the Persian. They have some original poetry, particularly on the subjects of their national wars. Their prose authors are chiefly on theology and law; but the Persian is still their learned language. Their plans of study are strictly methodical, partaking in no degree of a miscellaneous character. A book, if read at all, must be preceded by certain others.

The Afghân system of Islamism is the Sonnite, which is distinguished by the acknowledgment of the three first caliphs as true successors of Mahomet. They entertain a great horror against heretics, infidels, and idolaters. Some instances have occurred of capital punishments, inflicted, at the instance of the Mollahs, on individuals of the Shecite sect for blasphemy. But they are on the whole tolerant to those whom they reckon infidels, in their own country. The Hindoos enjoy the free exercise of their religion; their temples are unmolested, though they are forbidden all public processions, and all exhibitions of their idols. They are employed in offices of trust, and are as much at their ease as most of the other inhabitants. The Sikhs praise the Afghâns for their tolerant conduct towards them; while they are treated with contempt and aversion by the Persians. Mr. Foster, as an individual Christian, was treated rather contemptuously. The Sheeahs, or Sheeites, are more discountenanced than any other sect, as is often the case in matters of religion; those who are nearest to us in their belief are least willingly forgiven for not going the whole length of our particular creed. There is a sect called Soofees, who are a sort of enthusiastical religious philosophers, resembling Platonists or Pantheists. There is another called that of the Moollah Zookee, the adherents of which renounce all belief in prophecy and revelation, and have the character of being dissolute and profligate in their lives. The Afghâns, in general, have much personal religion, and seem to be habitually occupied with pious reflections. They are very regular in performing their devotions. Their toleration does not arise from indifference, but from their considering religion as a personal concern; and they are often sufficiently capable of giving credit to others for firmness of profession. Regularity in observance of the prayers and fasts is often enforced by the municipal law, and the breach of them punished by the Moohtesib, a regular officer appointed for the purpose, whose office, however, is very unpopular, and exposed to the continual reproach of corruption and partiality. The mollahs inculcate austerity of life; they often break such instruments of music as are not deemed warlike, such as lutes and fiddles; sparing drums, trumpets, and hautboys. They are in possession of the greater part of the learning of

the country, and many of them are sensible and agreeable men. They are actuated by a strong corporation spirit, and often avail themselves of the prevalent superstitious respect in which they are held, to raise mobs in their own cause. Their formal curses are much dreaded. This body of men is useful in repressing many lawless passions; at the same time it prevents the advancement of society to a better state, which can only be effected by the introduction of a desire and opportunities of information, independent of their influence. There are likewise some recluse persons, esteemed as saints, under the names of Dervises, Fuheers,[a] &c. who are treated with still greater reverence, though they do not in the least interfere with civil or secular matters. These sometimes lay claim to supernatural powers or communications. The Afghâns believe in alchymy, magic, astrology, and the prophetic character of dreams; and they seek for direction in weighty concerns by turning up the Korân at random, after fasting and prayer. Sometimes, with less solemnity, they make a similar use of the poems of Hafiz, and other books, to peep into futurity.

The Afghâns are remarkably hospitable. They have a peculiar custom, called *Nanawautee*, (meaning, "I have come in,") by which a person who has a favour to ask goes to the house or tent of the man on whom it depends, and refuses to sit on his carpet, or partake of his hospitality, till he grants the required boon. This is felt as an irresistible tie, in opposition to very strong contrary motives. A still stronger appeal is made, though not connected with the law of hospitality, when a woman sends her veil to an Afghân, and implores his assistance for herself or her family. The protection conferred by the rights of hospitality ceases when the object of it is beyond the lands of the village or tribe, and in this situation the same individual is reckoned a fair object of plunder. They attend much more, on all occasions, to the conferring of favours than to the respecting of rights. Plunder among themselves is chiefly repressed by the defensive exertions of the injured tribe. Strangers are sure to be plundered, unless they obtain a protecting escort from the tribe through whose territories they pass. Some tribes are in this particular more infamous than others. In times of political confusion, travelling is not safe on any terms, or in any part of the country. But their robberies are never aggravated by murder. A man may be killed in defence of his property, but his life is in no danger when he ceases to resist.

The houses are made of unburned brick, one story high. Their only furniture is pieces of carpet or felt, for sitting and sleeping on. Sometimes the room is surrounded with broad raised benches, called *sopha* or *sufé*. They sit cross-legged when at their ease. Their ordinary employment, when seated, is conversation; a kalioon for smoking is passed round occasionally, and, after a whiff or two, is sent away. They are not great smokers, but much addicted to snuff, which they keep in round or oval boxes, formed of a sort of nut-shell called balaughoon, without a lid, but having a hole at one end for pouring out the snuff. At first meeting, some ceremonious words, with solemn gestures, are passed, after which they are quite unrestrained and social. They delight in tales of kings, genii, and fairies. Their favourite amusement is the chase. Their dress is various; partaking of the Persian in the western, and of the Indian in the eastern parts of the country. Their mode of travelling is on horseback, at a walking pace. The women are carried in a sort of hampers, called cudjawas, slung over the animal's back. For women of distinction they are carried between two. The Afghâns, like the other Mahometans, have slaves brought from Africa, through Arabia; some Persians, bought from the Belooches, who have kidnapped them; and some purchased or carried off from their northern neighbours the Caufirs. The Afghâns are not so frivolous nor so habitually false as the Indians; and are perhaps more sincere, though less polished, than the Persians. The attachment which subsists in families and clans is strong and faithful; the royal families are almost the only exceptions, being frequently scenes of keen and sometimes merciless rivalry. They are proud of their descent, and fond of genealogies; grateful for favours, though irritable in cases of slights. They will do any thing that is wanted of them with much more zeal if a present is made in advance, than if it is withheld in the hope of quickening them by expectancy. No Afghân ever keeps a shop, or exercises any handicraft trade. Prohibited by their religion from taking interest for money, they are dependent on resident Hindoos as bankers. Their artificers are of the same nation, or Persians or Taujiks. These are subjected to some hardships and grievances in the towns, from the strictness of the police, which is in the hands of the Mollahs, and in some degree inquisitorial. In summer the inhabitants of the towns rise at half past three, then go to the mosque to prayer, then take a light breakfast, after which they repair to their shops. They take a luncheon at eleven, and then sleep for two hours. Their great meal is after the last prayers, and called *Shaw mee*. The food of the common people is leavened bread, rice, flesh, vegetables, sometimes cheese, and always a sort of dried curd called koroot. One of their great amusements arises from their passion for pleasure parties, in gardens, or on distant rural excursions to some of the most pleasing scenery of the country. They have often singing and playing in their houses, and delight in fighting cocks and quails. They have some forms of bodily exercise, which they employ even in their houses, which contribute powerfully to their muscular vigour. On the whole, a degree of happiness and ease is enjoyed by the inhabitants of the towns, which might appear altogether inconceivable when we consider the external circumstances in which they are placed.

The houses of the great are very magnificent and spacious; surrounded with high walls containing several courts. The halls are supported by tall wooden pillars, and Moorish arches, carved, painted, and ornamented with figures of flowers. These are often enlivened with paintings, executed in Persia. Their dress is on the Persian model. The place of honour is the corner of the room at the end opposite the entrance, and there the master sits. One side of the room is open to a garden or court, and a row of servants is drawn up out of doors, immediately below. The

[a] Fakirs?

manners of the great are mild and plain, but dignified. The servants are remarkable for activity and fidelity, and are often entrusted with important secrets. Their masters send them with the most confidential messages, without taking any precaution, except that of providing for their being believed. For this purpose a ring is given, or some indifferent occurrence is referred to which is known only to the master and the person to whom the messenger is sent. The great do not get out of bed till sunrise. They read and pray for about an hour, then breakfast; after which they repair to court, where they transact business. Their amusements are hunting and hawking. They keep about them persons whose profession it is to read to them; the favourite book being the Shauh Naumeh, the great heroic poem of Ferdoosi. Chess, backgammon, and cards, are also resorted to. Their entertainments are served up with great neatness, as well as magnificence. The servants, however, snuff the candles into a tea-cup with a pair of scissors. They separate the joints of the meat with penknives, and, tearing it to pieces with their hands, which have been washed immediately before, lay it on the plates before the guests. The conduct of the great has a much more favourable aspect when among the people of their tribe than at court, where corruption usually prevails.

The exports from the Afghân country to India are principally horses and poneys, furs, shawls, Mooltan chintz, madder, assafœtida, tobacco, almonds, pistachio nuts, walnuts, hazle-nuts, and fruits. The fruits are generally dried, but a great quantity fresh, being pulled before they are ripe, and carefully packed up in boxes with cotton. The imports from India are coarse cotton cloths, worn by the common people in every part; muslins, silk stuffs, and brocade, indigo in great quantities, ivory, chalk, bamboos, wax, tin, sandal-wood, sugar, spices, and cowries. The exports to Independent Tartary consist of articles previously imported from India, or made in the Indian provinces of the kingdom. The principal imports from that country are horses, and gold and silver in the form of coin or of Chinese ingots. Cochineal, broad cloth, pots, and hardware, come from Bokhara, being originally brought from Russia; also Russian leather, tin beads, spectacles, and other European articles. Oormuk, a fine cloth of camel's wool, cotton, and some lamb skins, are imported from Bokhara itself; and a few of the two humped camels from the Kuzzauk country. With Persia an interchange of manufactures is the chief trade; they also receive from that country quantities of raw silk, corn, and bullion, and some Indian chintz, which is brought from Coromandel to Abushehr in the Persian Gulph, and then carried across the country to Afghânistan.

Mr. Elphinstone gives a minute delineation of the characters and manners of the different Afghân tribes, for which we must refer to his work. The eastern tribes are in general called Berdooranees; the most conspicuous among them is that of the Yoosofzyes, who are remarkably quarrelsome both towards their neighbours and among themselves. They live on the north side of the river Caubul. Another division consists of the tribes of the Solimân range, the Kheiberees, Vizerees, and others; and the third that of the western Afghans, the most conspicuous of whom are the Dooranees and the Ghiljies. These two are a sort of rivals; the former being the ruling tribe, and that to which the present king belongs; the latter formerly enjoyed that honour, and under them the Afghâns once subjugated the whole of Persia. The Ghiljies are ferocious and vindictive to their enemies; while the Dooranees are mild as well as manly, and the most respectable of the whole Afghân nation. Some of them lead an agricultural and others a pastoral life. The former live chiefly in villages, a common form of which is that of four streets leading into a square in the centre. There is sometimes a pond, and always some trees in this space, where the young men assemble in the evenings to pursue their sports, while the old men look on and converse. The houses are of brick burned or unburned, cemented with mud mixed with chopt straw. The roofs are sometimes in the form of terraces laid on beams, but more frequently composed of three or four low domes of brick. A house generally consists of only one apartment; and is surrounded by a few outhouses. The villages are for the most part close by the castle of a khan. Many even of the agricultural Dooranees live in tents of black blankets or thick felt. The common ones are low, but those of the khans are comparatively spacious, and high enough to admit a camel. The pastoral tribes for the most part lead an easy and peaceful life, to which they are very much attached, but those on the confines of Persia are fierce and active in their border wars.

The city of Kandahar is in the Dooranee country. It is large and populous; and superior to most Asiatic cities, having the advantage of being built on a plan, but not at all magnificent. The most of it is built of brick cemented with mud. Its external appearance is not remarkable. The greater part of its inhabitants are Afghâns, which is not the case with the other large towns. The Ghiljies possess the country situated between that of the Dooranees and the city of Caubul. It contains the city of Ghiznee, which was the capital of Afghânistan, when at its height of power, and holding all Persia in subjection. This was in the beginning of the last century. It is now reduced to a town of 1500 houses, besides suburbs without the walls. It contains two lofty minarets. The tomb of the great Sultan Mahmood is about three miles from the city, a spacious but not a magnificent building, covered with a cupola. The tomb-stone is of white marble, it has some verses of the Koran inscribed on it; and some Mollahs are still maintained, who incessantly read the Koran aloud over the grave. There are a few other antiquities, one of the most useful of which is an embankment across a stream, by means of which the city and the fields are supplied with water.

The city of Caubul, the present capital, is handsome, but not extensive. The houses are of wood; Mr. Foster praises the abundance and arrangement of its bazars. On the top of a hill, over the city, is the tomb of the celebrated emperor and historian Bauber. The climate and local scenery of that place are delightful.

We now proceed to give a short account of the dependencies of the Afghân government. The only one which they at present possess in Turkestan is the town

and district of Balk, or Bulkh, a tract which has the Oxus on the north, the mountains of Hindoo Coosh and Paropamisus on the south, Budukshaun on the east, and a desert on the west. This country lies lower than Afghânistan, the descent from the mountains on the north being much greater and more rapid than on the south. The city of Balkh is of the most remote antiquity; it was known to the Greeks in Alexander's time, under the name of Bactra. It had been the capital of Persia at a much earlier period, being fixed on as the royal residence, by Ky Koosroo, supposed to be the same with Cyrus the Great. All the Asiatics are impressed with the idea of its being the oldest city in the world. It is now insignificant, but has extensive ruins. The surrounding country is flat, fertile, and well cultivated. It is said to contain 360 villages, and is watered by eighteen canals, drawn from a celebrated reservoir in the Paropamisan mountains. One of them was reckoned to produce an annual revenue of L.9000 sterling. The people of this district resemble the rest of the Uzbek Tartars, being uncommonly strict as Sonnee Mahometans, and regulating their conduct entirely by the Koran, which is their only rule, both in private life and in the administration of justice.[a]

The Paropamisan range of mountains is inhabited by two races, which, though subject to the Afghân government, are not of Afghân descent, and differ from them entirely in language, appearance, and manners. Their language is a dialect of the Persian. They seem to be of the same race, but divided by difference of religion, the Eimauks being rigid Sonnees, and the Hazaurehs violent Sheeahs. The governments of both are despotic, whereas those of the Afghân tribes are remarkably the reverse. The country of the Eimauks is the farthest west, and the least mountainous, but the hills are lofty and steep towards Herât. The Eimauk chiefs sometimes inhabit spacious palaces in strong castles, where they maintain little courts, and are attended by splendid retinues. They levy taxes on their tribes, and keep troops in their own pay, and mounted on their own horses. The administration of justice, and the right of life and death, are in their hands. These people keep many sheep, and rear a small but hardy breed of horses. They eat horse flesh. In other respects they resemble the Afghâns, but their despotic governments give them an appearance of greater order and quiet. In war they show a degree of ferocity not known among the Afghâns, sometimes throwing their prisoners over precipices, at others shooting them with arrows, drinking the warm blood of their enemies, and rubbing it over their faces and beards. Two tribes of Eimauks, situated to the west of Hierât, are subject to Persia. The number of the Eimauks may amount to 400 or 450,000.

The term Hazaureh has been differently applied. There is a subordinate tribe of the Eimauks, called the Hazaureh. The regiments into which the Tartar armies were divided used to be called Hazaurehs; but the Hazaureh nation is not to be confounded with either of these, although it may be conjectured to have owed its origin to the armies now mentioned, which were left to occupy part of the conquered country. The country of the Hazaurehs is more rugged than that of the Eimauks. It is unfavourable to the culture of grain; and hence animal food, including horse flesh, and the productions of the dairy, are, with that people, more important articles of diet. They live in thatched houses, half sunk in the slopes of the hills. The inhabitants twist rolls of cloth round their legs, instead of stockings, a custom common to them with the Uzbeks. The women wear long frocks of woollen stuff, and boots of soft deer-skin as high as the knees. Their cap sits close to the head, and a slip of cloth hangs down behind half way to the ground. They have strong Tartar features, but their habit of body is stouter and plumper than that of the Tartars. The women are often handsome, and have an ascendancy unexampled in the neighbouring countries. The wife manages the house, takes care of the property, does her share of the honours, and is much consulted in all her husband's measures. Women are never beaten; they have no concealment, but are said to be indifferent in their character for chastity. Both sexes spend much of their time in the house, sitting round a stove. They are all great singers and players on the guitar, and many of them poets. Lovers and their mistresses sing verses to one another of their own composing, and men often sit for hours railing at each other in extemporaneous satire. Their amusements out of doors are hunting, shooting deer, and racing. They are good archers, and every man has a match-lock. They are passionate, exceedingly fickle, and often engaged in broils among themselves; yet a merry, conversible, good natured and hospitable race. An extreme simplicity prevails among them. It is said that they believe the king of Caubul to be as high as the tower of a castle. They are not exempt from falsehood. They live in villages of from twenty to a hundred houses, each village having a high tower for defence, in which a sentinel constantly watches, and if necessary, sounds the kettle drum; when the sound is taken up from hill to hill, and two or three thousand men are in a short time assembled at the point of attack. They are divided into tribes, each of which has a Sultan, who lives in considerable state, and is armed with high powers. They have, however, some democratic tribes. They are all enthusiastical followers of Ali, hold in detestation the Afghâns, Eimauks, and Uzbeks, for following the sect of the Sonnees, and insult, if they do not persecute, every Sonnite who enters their country. They even distrust such of their own countrymen as have been much among the Afghâns, suspecting them of a degree of deterioration. They have little intercourse with the rest of mankind. The little trade they have is carried on by barter; sugar and salt are the

[a] Balkh contains 3000 houses, and a castle or citadel. It is nominally subject to Caubul, but its actual ruler is Khalich Ali Khan. His revenues amount to 30,000 rupees; his army to 12,000 horse. The population consists of Tajiks, Usheks, and Afghans. The climate is unhealthy. Khulm, a populous town, in a more elevated district, is a noted mart for Turcoman horses. It is much frequented by Hindoos, from Shikarpour. It is dependent on Khalich Ali who has also conquered the Dehrangi Hazorehs in the mountains between Balkh and Caubul. He professes fealty to Caubul, but is actually independent. Kundur, E. of Khulm, is a low country between two branches of the Gihon, the Bengi ard Akserai. Its ruler is Murad Bey, a nephew of Khalich Ali. N. of the Gihon are several petty states, more or less independent. The principal chiefs are Mural Alik, of the Uwaili Usbeks, and Dost Mohammed, of the Dermanch Usbeks.—P.

foreign commodities most in request. Their country, though more extensive, is less peopled than that of the Eimauks, and their number probably does not exceed from 300, to 350,000 souls. The country of the Hazaurehs contains two idols, representing a man and a woman, the former twenty yards high, and the latter fourteen. The man has a turban on his head, one hand is held up to his mouth, and the other across his breast. These are thought to be relics of the worship of Boodh, and resemble the colossal statues at the entrance of the temples consecrated to that religion.

Herât, though within the limits of the Dooranee country, forms a distinct government, and is in little subjection to the general government of the kingdom. The city of this name is one of the most ancient and renowned in the east. It was formerly called Heri, and gave its name to an extensive province in the time of Alexander. It was long the capital of Tamerlane's empire. From his descendants it passed into the hands of the Sophi Kings of Persia, from whom it was taken by the Dooranees in 1715; it was taken again by Nadir Shah in 1731, and retaken by the Afghân king, Ahmed Shah, in 1749. It surpasses the other Afghân cities in magnificence. It has a very spacious and elegant mosque, surrounded by domes and minarets, and ornamented with the shining painted tile which is so much used in all the Persian buildings. It is surrounded by a broad wet ditch, covers a great space, and contains about 100,000 inhabitants. Two-thirds consist of ancient inhabitants who are all Sheeahs, a tenth Dooranees, and the rest Eimauks and Moguls, together with the same mixture as the other towns of the kingdom. The inhabitants of the surrounding country are mostly Taujiks, who, like the rest of that race, bear a very respectable character. The revenue of Herât is reckoned at a million of rupees, one half of which is applied to the maintenance of local troops, and the payment of salaries, while the other passes into the royal treasury. The government is generally held by a son of the King of Caubul. The present is Feeroz Oosden, brother of the king, a mild and respectable, though rather a timid character. It is less subject to the Afghân kingdom than its other dependencies, being occasionally attacked or threatened by the Persian power, and obliged to purchase its peace on the condition of payments, which constitute a sort of irregular tribute. Mr. Kinneir represents it as subject to the king of Persia, but the family to which the governor belongs appears decisive of its subjection to the Afghâns.[a]

The province of Seistan exhibits a scene of deplorable degeneracy, both in its physical and moral character. The numerous ruins which it still contains testify it to have been once a fertile country, full of cities scarcely surpassed by any in Asia. These reverses are the effects of the perpetual encroachments of the sands of the deserts by which it is surrounded on all sides except the north, where it joins the Dooranee country. Every wind brings clouds of a light drifting sand, which destroys the fertility of the fields, and gradually overwhelms the villages. The only parts which retain their fertility are the immediate banks of the rivers Helmund and Furra-Rood, and of the lake of Durra into which they flow. This lake is about 150 miles in circumference. The water is not salt, but brackish, and scarcely fit for drinking. In the centre there is an island called Copee Zoor, or "the hill of strength," sometimes the fort of Roostum. It is still an occasional place of refuge for the inhabitants of the shores. The miry banks are occupied by a rank and irregular vegetation of rushes and reeds, frequented by herds of oxen kept by a set of persons who seem to form a distinct race Exterior to these a stripe of land produces grass, grain, and tamarisks. The rest of the country is almost a desert, producing some forage for camels, and here and there a well for the wandering Belooches, to whom these animals belong. The original inhabitants of Seistan are Taujiks, to which have been added two other tribes from Persian Irak, all of whom resemble the Persians in character and manners. The Belooches have extended into this country, and are commanded by Jehaun Khan, who is a terror to the caravans, and to the neighbouring countries. The lineal descendant of the ancient chiefs of Seistan, Mullik Behrân Khânee, assumes the title and state of royalty, but has scarcely a thousand men at his disposal.

Beloochistan, occupying the greatest part of Mekrân, extends from Afghânistan on the north to the Indian ocean on the south. It has Kerman in Persia on the west, and Sind on the east. It is the ancient *Gedrosia*. It is an hundred miles long,[b] and three hundred and fifty broad. The largest division belongs to the Khan of Kelât, comprehending the table land, which is cold, rugged, and barren, but resembles the Afghân country, and the low parts called Sewestân, which are not to be confounded with Seistan, already described, but lying on the south and on the east. These tracts are hot, and generally dry; but round Gundawa, Dauder, and other towns, well watered and cultivated. They are mostly inhabited by Juts. The inhabitants of the table land are Brahoo Belooches, mixed with Taujiks. The former are a hospitable and honest people, but deprived of the advantages of civilization, and have a genera resemblance to the Afghâns. The plains are inhabited by another race, distinct in language and most other particulars, who are called Rind. These are determined and sanguinary robbers. Plunder on a small scale is held by them in contempt. When they intend to make a *chepao*, or foray, they set out on camels, each man having the charge of ten or twelve, and ride eighty miles a day, till they approach the destined scene of operations, lurk in some unfrequented jungle in the neighbourhood, rush out at midnight, set the devoted village on fire, and kill or carry off men, women, children and flocks. The captives are blind-folded and tied on camels, that they may never know the road back to their native spot. Messrs. Pottinger and Christie, in a perilous journey which they undertook across this region, found to the west of the Belooches, in Mekrân Proper, Loories, and other tribes of a meaner and more brutal class, who are abandoned to every species of depravity, plunder in every shape, and murder in cold blood on the slightest resentment. They scarcely rear

[a] In 1825, there was a war in Herat, between the Dooranees and the Persians.—P.

[b] 500 miles long? extent 176,000 sq. miles.—P.

any children, and keep up their communities chiefly by man-stealing.

Lower Sind is a country justly compared to the Delta of Egypt in all its physical characters. The former capital was Tatta, the ancient *Pattala;* the present is Hyderabad. It is rather barbarously governed by three brothers called Ameers, in the name of the Afghân kings, and a revenue of sixty-one lacks of rupees, (L. 767,000,) is raised by every sort of extortion and oppression. They ought to pay 1,500,000 rupees, (fifteen lacks,) annually to the king, but have generally withheld it, unless when in immediate fear of the royal armies. They maintain a force of 38,000 irregular cavalry. The Sindees are a handsome race, blacker than most of the people of India, but have the character of being treacherous, cruel, licentious, and very deficient in intelligence.

Shirkapoor, in Upper Sind, is bounded by the Indus on the east, and the Belooche country on the west. The town is of considerable size, surrounded with a mud wall. It contains several wealthy bankers; and Shirkapooree bankers are found in all the towns of Afghânistan and Turkestan. It is governed by a Hâkim, who keeps very few troops, and pays a revenue of three lacks of rupees. The country of the Mozaurees to the north is inhabited chiefly by Belooches. Bahawulpoor includes, for a certain distance, the banks of the Indus, and its two tributaries, the Hydaspes and the Acesines. Above this is Mooltan, which is exposed to many revolutions, being sometimes in the hands of the Mahrattas, and recently threatened by the Sikhs.

The valley of Cashmere is surrounded by lofty mountains, which on the north divide it from little Thibet, from Ladauk on the east, from the Punjaub on the south, and from Pukhlee on the west. On the north-west a branch of the Speen (or white) Caufirs, comes in contact with it. The Cashmerians are a distinct race of Hindoos, peculiar in language and manners. The men are stout, active, and industrious, much addicted to pleasure, and notorious for falsehood and cunning. They are chiefly Mussulmans. In the year 742 of the Hegira, the Hindoo kings were succeeded by a Mahometan dynasty. This, after reigning nearly 300 years, was subdued by the son of Bauber, and Cashmere remained in the hands of the Moguls, till the time of Ahmed Shah, when it was taken by the Dooranee Afghâns. It is governed with a strong hand, no natives being allowed the use of arms within the city. The administration is tyrannical, and numerous spies are employed. The city of Cashmere is the largest in the Afghân dominions, and contains from 150 to 200,000 inhabitants. The gross revenue of the provinces is said to be 4,626,300 rupees, (or nearly L. 500,000.) The governor has constantly at his disposal a force of 5400 horse, and 3200 infantry. The most remarkable production of Cashmere is its shawls, which are said to occupy sixteen thousand looms.

The royal power is subjected to greater control among the Afghâns than in most other Asiatic countries, as the power of the Dooranee aristocracy, and the organization of the other tribes are permanent; and notwithstanding the division into tribes, and the rivalry which sometimes exists among them, there is a general sentiment of regard for the public interest, and the honour of the Afghân name. There is no regular or well matured constitution, yet there are some established customs and practical opinions respecting the government. There is no fixed rule for the crown descending to the eldest son. When a king dies, it has been usual for the great Dooranee Sirdars present at the court, to meet and consider which of his sons is to succeed. Their voice secures the possession of the capital; but the practice of conferring the different great governments on the king's sons generally leads to a contest. The whole of the royal family, except those whom the king particularly favours, are closely confined in the upper citadel of Caubul, where they are well treated. Those who remain at large are appointed to the government of provinces or the command of armies. The king has the exclusive privilege of coining, and the right of war and peace; all appointments are in his gift, though in many cases his choice is confined to particular families; of this description are the chiefships of tribes. Some offices of the state, and many even of the king's household, are also hereditary. He has the entire control of the revenue, both in collection and expenditure, but he cannot increase the settlement of the land revenue fixed by Ahmed Shah, which is extremely easy. The only means by which he can increase his resources derived from the Afghâns are fines, compositions for military service, and sometimes arbitrary valuations of the productions of the land. He has the control of military levies, and the command of the army; he has the direction of religious affairs, but has little room for interference. His general policy is to keep the Dooranee tribe in subjection to himself, while he exalts them over the other Afghâns. Therefore he protects the Taujiks, or townsmen not belonging to the clans, and all others whose power he can use to depress the nobles. His men are got from the western, and money chiefly from the eastern tribes. The Afghân views of conquest are directed rather to the east than to the west of their present territory. The riches of the Indian provinces are the chief temptations. They threatened India of late years during the wars of Buonaparte; and one object of the diplomatic intercourse opened between Great-Britain and Persia was, to induce the latter power to form a diversion on the west in case of their attempting to invade India. The mission was attended with the desired effect of preventing such a movement on the part of the Afghâns.—The punishments inflicted on offenders among the Afghâns are lenient compared with the severity of the Persians. The practice of maiming or blinding the common people is unknown. But the government often resorts to perfidious measures to seize offenders, and employs torture, especially on the rich, for extorting money. The chief minister is called Vizier-Azem, as in Turkey; he manages the revenue, and controls the other departments. Next to him are the Moonshee-Baushee, or chief secretary, who manages the king's correspondence; and the Hircarrah-Baushee, who is at the head of the intelligence department. The officers of the court and household are very numerous, being formed on the model of Nadir Shah's; each of the branches belonging to it is distinguished by a particular dress. The appearance of the court is regular and decorous. Each of the eighteen most important provinces of the

kingdom is governed by a Hâkim, to collect the revenue and command the militia, and a Sirdar to command the regular troops and preserve public tranquillity. These act through the medium of the heads of tribes where the latter are powerful; where the tribes are weak, they send their orders directly to the heads of subdivisions. The principal source of the king's income is the land revenue. Some payments in kind are appropriated to the maintenance of the king's household. These are from particular lands. The real revenue falls within two crores of rupees, or two millions sterling. The Dooranee clans are obliged to furnish 12,000 men as the condition on which they hold their *tekools*, or rent-free lands, granted them by Ahmed-Shah and Nadir. The establishment of the Ghollaum-Kauneh, a force formed by Ahmed-Shah from the foreigners found in the Dooranee country, and recruited afterwards from the Taujiks of Caubul, is upwards of 15,000 men. The interest of these troops secures their fidelity to the king. He has also 700 or 800 Shaheenchees, or men mounted on camels, which carry large swivels. The troops kept by the governors of provinces can seldom be employed, except in wars carried on in their neighbourhood. Another division of the army is called Karra-Nokur, furnished by the owners of land; the numbers vary in the different localities. Their number taken together is less than that of either of the first two branches. These troops are all cavalry, except a corps not exceeding 2000, furnished by the Cohistan of Caubul. There is a militia called Eeljauree, raised on extraordinary occasions, generally understood to be a tenth part of the population, though that proportion is seldom realized. These are paid by the chiefs of the tribes. They are almost all infantry. Compulsion is generally necessary to bring them out, their pay being small, except when the army is bound for India, where they will even go without pay in hopes of plunder. In foreign invasions the people may be raised *en masse;* this is called *ooloosee* from *ooloos*, the Afghân term for a tribe. The regular troops are almost all cavalry. The horses belong to the men, except those on which 500 personal servants of the king are mounted. A Persian sword and a matchlock are the usual arms. They are unacquainted with regular tactics, although expert in the use of arms and the management of their horses; and, were it not for the nature of their country, they would make a very indifferent resistance to a regular army, though their courage is respectable, and their military habits are kept in exercise by the unsettled state of their political society.[a]

[a] From recent accounts, the Afghân government is in a very unsettled state. Two rival authorities have been established for some time, at Herat and Peshawer. The present rulers are Dost Mohammed, at Herat; and Yar-Moh and Pur-Dil, at Peshawer. The late ruler at Peshawer, has resided for some time, in retirement, in British India. It is said to be the intention of Runjeet Singh, chief of the Sikhs, to restore him, and that hostilities had commenced between him and the Afghâns. On the other hand, Dost Mohammed is said to have been recently engaged in hostilities with the Persians.—P.

BOOK XXXVI.

INDEPENDENT TARTARY.

Comprehending Great Bukharia, Kowaresmia, Turcomania, Turkestan, and the country of the Kirghis.

The countries lying to the east of the Caspian Sea, which are watered by the Oxus and the Iaxartes, went under the name of Asiatic Scythia among the Greeks. It is possible, and even probable, that the true Scythians of Europe, the Finnish tribes, of which we shall speak in their proper place, occupied this country at a very remote epoch; but the nations known in history as inhabitants of Scythia in Asia appear to have had one common origin with the modern Tartars or Tatars. The Tartar names of rivers, of mountains, and of provinces,[a] are recognised in the midst of the Persian names introduced into Grecian geography since the time of Alexander, and no trace of the Finnish languages is to be discovered among them. Besides, no history from the age of Alexander down to the fourth or fifth century gives any certain account of a great migration of people, that could have brought new colonies into these countries.

But warlike and nomade tribes must often have changed their degree of consequence, their name, and their situation. Between the second and fourth centuries, the Sacæ and Massagetæ disappeared from the map. Persia and Byzantium became acquainted with the formidable names of the Turks of Transoxiana, and the White Huns, or Ephthalites. But these last, so named because they lived upon the Oxus, called in Persia *Aptelah*, were probably Turks, and perhaps the very same as the Uzes or Uzbecks, who, after many revolutions, became ultimate masters of Great Bukharia. The Turks, whose capital at one time was Taraz, and afterwards Otrar, gave the name of Turkestan to a great extent of country. All the nations whom we denominate Tartars, acknowledge the appellation of Turks as belonging to them in common.[b] It occurs in Pomponius Mela and in Pliny; and there is no reason why we should erase it from their works.[c d] If it is retained, its antiquity is at least anterior to the age of these compilers. This celebrated name has found its way into the *sagas* of the Icelanders,[e] which seems to indicate some ancient connection between the Goths and the Turkish nations; traces of such a connection being at the same time found in their languages.

It was not till the twelfth century that the name of Tartars, or more correctly Tatars, became famous in Europe. Abul-Ghazi affirms, that there was among the Turkish hordes a tribe called Tatars, and he speaks of them as forming one of the largest divisions of the great Turkish nation. He says, again, that the Tatars were divided into several tribes; and that one of them maintained some bloody wars with the Chinese; an account which corresponds with the Chinese annals.[f] Some, however, consider the name Tatar as foreign to the Turkish nations, and as having been given to them by the Chinese; it appears that the latter give the name of *Tata* to the nomade nations of central Asia.[g] Another opinion is maintained, and some arguments offered in proof of it, by M. Etienne Quatremére, that the Tatars were a Mongol, and not a Turkish tribe.

Whatever the case may be, the name of Tatars, changed into Tartars notwithstanding the remonstrances of the learned,[h] was so much in vogue, in the fourteenth, fifteenth, and sixteenth centuries, that it invaded the whole of central and northern Asia. It absorbed that of the Mongols, although the latter held the Tartars in subjection. The cause of this fact may perhaps be found even in the victories of Genghis Khan. The Tartars subjugated by him were enlisted in his armies, and in those of his successors. They greatly exceeded in number those who were the original subjects and countrymen of these princes, and, in the end, caused the name of the Mongols, their conquerors, to be forgotten. This view of the subject is confirmed by the adoption of the Tatar language in all the countries conquered by the Genghissides, the inhabitants of which had previously used peculiar idioms which were neither Mongol nor Tatar. That preference of the Tatar to the Mongol would not have been general and constant, had not the Tartar nation been much more numerous than the other whose military glories it shared.

The Tartars differ as much from the Mongols in their features, physical constitution, and language, as the Moors do from the negroes. A slender figure, a European visage, though somewhat yellow in complexion, curled hair, and a long beard, distinguish the Tartar from the squat shapeless monster, with flat nose, prominent cheeks, almost beardless chin, and lank hair, who inhabits the deserts of Mongolia. The countries of these two races of men constitute two distinct physical regions. The Mongols, of whom the Kalmuks are a branch, occupy all the central plateau from Lake Palcati and the Beloor mountains to the great wall of China, and to the Siolki mountains which separate them

[a] Khowarezm, *Chorasmia*, (Ptol., Strab.) Kharizm, *Charasmii*, (Herod.) Uzes, *Utii*, (Herod.;) *Uitii*, (Strab.) Tokharestan, *Tochari*. Sakita, (d'Anville,) *Sacæ*. Turks, *Turcæ*, (Pomp. Mel.) Djihon, *Zonus*, (Plin.) Sihoun, *Silys*, (Plin.) Mus-Tag, *Imaus*, &c.

[b] Rytschkow, Orenburgskaia Topographia, t. I. ch. 1. Fischer, Quæstiones Petropolitanæ, p. 58. D'Anville, Mém. de l'Acad. des Inscriptions, t. LII. p. 201.

[c] "It is not yet decided whether we should erase it." M. B.—P

[d] Plin. VI. 7. Pomp. Mela, I. 21. Compare Herod. IV. 22.

[e] Snorro, Hemskringla, I. p. 2. Hervarar Saga, p. I. cap. I. Langfedgatal, &c.

[f] Histoire Généalogique des Tatars, p. 167; Histoire de l'Empire des Mogols, p. 5.

[g] Visdelou, Biblioth. Orient. p. 147.

[h] Leunclavius, Pandect. Histor. Turc. Langlès, Pallas, &c.

from the Mantchoos, a tribe of the great race of the Tongooses. The Tartars are the possessors of that extensive country which lies between the Beloor mountains on the one side, and the lake Aral and the Caspian Sea on the other, and which may be called either Tartary or Turkestan.

The Tartars have indeed inhabited, and even reigned over Little Bukharia; but there they have been subdued by the Kalmuks. On the other side, the Tartars once had possession of the *khanats* of *Sibir*, or kingdoms of Siberia, called also Tura, Kasan, Astrakan, and the Crimea; but these four states have fallen under the Russian dominion. A number of Tartars remain in these countries; some on the Tobol and the Irtysh, as far as the river Yeniseï; others in the neighbourhood of Kasan. A small number live in the Crimea, and some tribes have taken refuge in Caucasus, where they settle round those posts which are protected by the Russian arms from the lawlessness of the native mountaineers. Tartary is thus very extensive in an ethnographic sense, as denoting the country inhabited by Tartars. But the independent Tartar nations are confined within narrower limits. They occupy only the physical region bounded on the north by the Algydim-Shalo mountains, or the course of the Irtysh; on the west by the course of the Ural and the Caspian Sea; on the south by Khorasan and the mountains of Gaoor or Paropamisus, and on the east by the chain of Beloor.

On the north, the steppe of Issim and the river Yaïk, or Ural, separate Tartary from Russia. The Beloor mountains are its barrier on the side of China. On the west the Caspian Sea furnishes a natural frontier; on the south it has no similar barrier to secure it from the invasions of the Afghâns, as that power is in possession of the city and territory of Balk. Still Tartary, geographically considered, must be extended on the south to the Hindoo Coosh mountains, which separate it from Afghânistan.

This country, without including the steppe of Issim, which is claimed by the Russians, has more than 460,000 square miles[a] of surface; though it probably does not support six millions[b] of inhabitants.

The leading divisions are, on the north, the country of the Kirguis, with the districts of the Karakalpaks and of the Aralians, and the states of Tashkent and Turkestan; on the west Khowaresmia, with the country of the Turcomans or Truckmenes; on the south-east Great Bukharia, with Fergana, and the countries of Sogd, Orushna, and others.[c]

Tartary, as now defined, may be regarded as the western declivity of the great plateau of central Asia. It is a series of basins, all of which terminate in the Caspian Sea and the lake Aral. A great part of this country must have very little elevation; but it is hemmed in by mountains on the south, on the east, and partly on the north. The principal mountains on the east are those of Beloor, or Beloot-Tag,[d] which constitute a great chain, covered with perpetual snow. On the north-east this chain is continued in the Alak, called also Alak-oola, a term which signifies in the Kirguis language "the Speckled Mountains," forming the northern boundary of Little Bukharia, and joining the great Bogdo, asserted by the Mongols and Tartars to be the highest mountain of central Asia. The Alak mountains are also named Musart, according to Pallas, and contain glaciers. On the south, Great Bukharia is bounded by the Hindoo Coosh, and the mountains of Gaoor, which are merely an extension of the Beloor mountains; at least we know of no interruption, except a narrow gorge to the south of Anderab. All the east part of the basin of the Gihon is surrounded and filled with mountains, from which the river issues a little way from the town of Termed; the defile is not more than a hundred paces wide, and the sublime horrors of the place are well expressed by the Persian name given to it, Djani-Sheer, which means "the Lion's Throat."[e] Immediately after this the sandy plains commence. Between the basins of the Gihon and of the Sihon, or Syr-Daria, the chain of Ak-Tau, or "the white mountain," is extended, being a branch detached from the Beloor. The Kisik-Tag, or "little mountain," which rises in the country of the Kirghis, is probably the extremity of a branch sent in that direction from the great Altaïc chain. The Ural chain terminates between the sources of the Tobol and the Russian post of Orskaia. From that point it gives off two chains of elevated land; one to the east, which, traversing the steppe of the Kirguis, is known by the Kirghisian name Ulu-Tau, or "the Great Mountains," as far as the river Ishim, and from the Ishim to the Irtysh is called in Russian Alginski, and in Kalmuk Algydim-Shalo. Another chain, also of moderate height, takes a direction, under the name of Moguldshar, towards the lake Aral, passing between it and the Caspian Sea, and is supposed to be continued, under the name of the mountains of Mangislak or Turcomania, as far as Khorasan.

A full half of Independent Tartary is occupied with immense steppes or desert plains. The greater part of their extent is occupied by the country of the Kirghis. There is a desert to the north of Great Bukharia, and another to the west. Khowaresm is encircled with deserts on all sides. The eastern shores of the Caspian Sea present nothing but a long and gloomy chain of arid downs and rocks. The whole flat country comprehended between the bottoms of the mountains and the valleys in which the rivers flow, seems condemned to aridity and barrenness.

Independent Tartary is watered by two large rivers, the Amoo and Syr. To each of these names, the termination *daria*, the Tartar term for a river, is subjoined The oriental geographers call the Amoo, Gihon, and the Syr, Sihon.

The Amoo takes its rise in the Beloor mountains, about 200 miles[f] to the north-east of Badakshan. At first it has the name of Harrat. After receiving a great number of rivers from Ak-Tau, which confines it to the north, and from Hindoo Coosh, which it leaves on the south, it descends near Termed into the plains. Its

[a] "60,000 sq. Fr. leagues."
[b] "5,000,000."
[c] Independent Tartary, included between the Persian and the Afghan territories on the S., the Caspian W., the Russian territories N., and the Chinese territories E., contains three principal states, to which most of the others are tributary, viz. the Khanats of Bucharia, Fergana and Khiwa.—P.
[d] "*Belur.*"
[e] Hadgi-Khalfah, p. 884. MS. translation.
[f] "More than 70 Fr. leagues."

waters, augmented by the addition of the Dehar, or river of Balk, and many other small rivers proceeding from the mountains of Gaoor, take a north-west direction, and fall into the sea of Aral, which appears to have been at every epoch its principal termination. The course of this river is longer than that of the Tigris, being in all probability not less than 886 or 900 miles.[a] It abounds with many kinds of fish. Of the tributary rivers, the three principal are the Sogd, or the river of Samarcand, the Mar-gab, which, however, according to some, loses itself in a lake which does not communicate with the Amoo, and, near its mouth, the Kisil-Dariah, or *Red River*, the longest and most considerable, and which besides sends off a distinct branch running separately into the lake Aral.

The Syr, or river of Sash, rises in like manner in the Beloor mountains, and after a course of 550 miles[b] falls into the Aral on its eastern side. Ibn-Haukal calls this river the Chajé or Shash. Its first source is the river Narin, which arises to the south of lake Tuseul, in the Alak chain, at the place of its junction with the Beloor, not far from the sources of the river Talas. At Otrar it receives the Taras, which some consider as identical with the Talas, while others are of opinion that the latter, as well as the Zouy, are two separate streams, which terminate in a small lake, or are lost in the sand. The Syr, in the remainder of its course, traverses the desert of Burruk. It is possible that by means of a number of small lakes and marshes it may have a sort of communication with the Sarasoo, a river which crosses the Kirguis country. In that country the rivers Irghiz and Turgai also flow, and lose themselves in a lake situated to the north of the lake Aral. Many of these lakes and rivers, now forgotten and unknown, possessed at one time a celebrity from being the scene of the victories of Genghis Khan and his successors, when these conquerors directed the progress of their arms to the north of the Caspian, and laid the greater part of European Russia at their feet.

The largest lake of these countries is that called the lake or sea of Aral, *i. e.* the "Sea of Eagles," and among the writers of the east, the lake of Khowaresm and the lake of Oghooz. Its waters have but little saline impregnation, and it contains, like the Caspian Sea, sturgeons and seals. If this lake was ever united with the Caspian Sea, it could only be by a narrow strait, since the plains which separate them are very elevated, and, according to some, the country between them even rises into mountains.[c] The eastern shores of this lake are flat and marshy.

The other lakes of Tartary are of no considerable extent, and generally remarkable for their saline nature. Through the whole of the steppe of Kirguis, such lakes are of frequent occurrence, and all the country situated between the lake of Aral and the Caspian Sea has an infinite number of brackish pools and marshes. This sort of lakes has been already considered with a reference to the general laws of physical geography.[d] It is rather singular that the mountainous regions in which the Oxus and Iaxartes take their rise, do not, like Upper Siberia, present a collection of lakes, generally so common in the neighbourhood of great mountain chains.

The climate of Tartary seems, in general, to be healthy. The heat even in the southern parts is moderated by the neighbourhood of the mountains, the summits of which are covered with eternal snow, and, though lying in the parallel of Spain, Greece, and Asiatic Turkey, the summers are rendered cool by the proximity of the deserts of Siberia, and of the Alps of Thibet. To the north of the Syr the winters are sometimes very severe. Shereffedyn has left us a dreadful description of that which the army of Tamerlane encountered, when collected on the banks of that river, to march against China. Some lost their noses and ears; the feet and hands of others dropt off; the heavens were in one cloud, and the surface of the earth was one extended mass of snow.[e]

To a travelling naturalist, Tartary would probably present the same variety of productions and of local situations as the Caucasian region. In one place, the surface of the earth stretches out in plains which present no visible boundary, covered either with coarse bent, or with an inundation of moving sand. In another place, it is intersected with numberless rivers, diversified with smiling hills, and bounded by steep mountains. Wood is in general scarce, as it is in eastern Persia, though it is possible that there may be unknown forests on the sides of the Beloor. On the margins of the rivers the fertility of the soil arrests attention, the grass exceeding in some places the height of a man. In some cantons, rice and other species of grain are cultivated with much industry and success. In better hands, these countries might make a flourishing figure. In Bukharia, the vine and other fruits of the south of Europe succeed. It appears that the mountains of the south-east, the Beloor and Hindoo Coosh, contain gold, silver, lapis-lazuli, and a peculiar production, the balass ruby, a crystal of a pale rose colour. It has its name from a canton called Balascia, the position of which is not well ascertained.[f] In the tenth century, before the industry of the natives was paralysed by a long series of oppression, sal-ammoniac, vitriol, iron, copper, lead, gold, and turquoises, were procured from Fergana, a canton situated near the sources of the Syr-Daria. Mines of mercury have been since discovered. In the mountain of Zarka there were also springs of naphtha and bitumen, and a stone which "kindles and burns," which must be mineral coal.[g] Countries which are better known will be studied more in detail. But we may mention here the general observation, that, according to Strabo, whose knowledge extended no farther than the Iaxartes, the Scythians of these countries were in want of iron and silver, but possessed copper and gold in abundance. These two metals are more easily worked. The ancient mining operations in the Altai and Ural mountains, ascribed to the Igoors and to the Fins, were likewise directed to the obtaining of gold and of copper.

[a] "320 Fr. leagues."
[b] "About 200 Fr. leagues."
[c] Mouraviev observed, in crossing the desert of the Turcomans, in his late mission to Khiwa, a wall of rock, running N. and S. between the two seas, and apparently forming, at some remote period, the E. shore of the Caspian.—P.
[d] See p. 113.
[e] Shereffedyn, Hist. de Timur-Beg, liv. VI. chap. 29.
[f] Marco Paolo.
[g] Hadgi-Khalfah, p. 866. MS. translation.

We shall begin our topographical survey of Tartary in the northern part. It is on this side that a traveller, along with a Russian caravan from Orenburg, could most readily find means to enter this country, which has been much neglected by modern travellers. The vast territory of the Kirghis first presents itself. The frontiers between these nomades and their neighbours the Russians and Chinese, are not determined in a precise manner. The lesser Kirghisian horde lives between the Yaïk, the sea of Aral, and the environs of Orenburg. The middle horde of the same people wanders along the north side of the Aral lake, as far as the river Saras on the south-east. It often pitches its tents beyond the Algydim-Shalo mountains in the steppe of Issim. The Russians in their maps include all this space within the limits of their own empire, though their sovereignty is merely nominal. The great horde extends to the south-east of the lake of Aral, over the country watered by the Sarasoo and the Syr, as far as the city of Tashkent, perhaps as far as Fergana.[a]

It is from the military expeditions of the Russians that the slight knowledge which we possess of this country has been obtained. It seems to present, in general, a mere succession of sandy downs and mountains, interspersed with hills of a clayey texture, and divided by vast plains of sand, where a number of rivers lose themselves in the sand, or in marshes and salt lakes. The mountains of Ulu-Tau begin with hills of argillaceous schistus, and sand-stone. We then pass different ranges of lime-stone rock, and in some places granite. Blocks of jasper, and milk-coloured quartz, are met with, together with various indications of copper, silver, lead, and false topaz.[b] One insulated mountain is composed of an indifferent ore of magnetic iron ; another of talc. The Algynski mountains are of the same materials, and have on the south a range of hills consisting of gypsum.

During winter a very strong north-wind prevails, accompanied with snow. The cold attending it is extreme, and the violent whirlwinds raise columns of dust to a height of thirty feet. The snow, however, lies a very short time, especially near the shores of the Caspian Sea.[c]

The salt lake of Indersk, near the river Ural, or Yaik, forms, according to the account of Professor Pallas, a sort of natural curiosity.[d] It is a sheet of water fifty miles[e] in circumference, so impregnated with salt as to give the surface a white colour. Salt springs are continually adding to its contents. The fogs which rise from it are impregnated with saline particles. The banks present a surprising mixture of clay and marly strata, oyster shells, crystals of alum, and of sulphur.

Saline plants predominate in this barren country; yet along the rivers there are different species of trees. Some of the valleys or low grounds are very agreeable in summer. Without extended pastures, the Kirghisians could not support so many horses, camels, black cattle, sheep, and goats, as we know them to possess. Pallas was informed that some individuals of the middle horde had 10,000 horses, 300 camels, 3000 or 4000 sheep, and more than 2000 goats. Their dromedaries, which they shear annually like sheep, furnish a large quantity of woolly hair, which is purchased by the Russians and Bukharians. Their ordinary food is mutton of the broad-tailed breed. Their lamb is so delicate as to be sent by way of Orenburg to Petersburgh for the table of the palace. The steppes furnish plenty of game wolves, foxes, badgers, ermines, weasels and marmots In the mountains of the south and east, there are wilc sheep, the yak, or Thibet ox, chamois, jackalls, a species of animals which has been taken for tigers, kulans or wild asses, the saiga antelope, and the *takia*, or wild horse.[f] The Kirghisians have trained for hunting the species of eagle called in Russian *berkut*, the "golden eagle"[g] of Pallas. Their vast marshes swarm with geese, ducks, and other aquatic birds. There are white serpents more than six feet long, which frightened the Russian troops, though the natives say that they are perfectly harmless. They are much afraid of a species of venomous spider, black and hairy, with eight eyes, and as large as a walnut.[h]

The Kirghisians have Tartar features, flat noses, and small eyes, but not oblique like those of the Mongols and Chinese. Their lives being frugal and peaceful, they enjoy a long and healthy old age. Their common diseases are intermittent fevers, colds, and asthma. The venereal disease prevails among them ; but the small-pox is what they most of all dread.[i]

The language of the Kirghisians is a dialect of the Tartar, which the other Tartars perfectly understand ; but their pronunciation is harsh, and they are fond of the allegorical style.[k] The hereditary princes of the Kirghisians have but little power, every thing being decided in general assemblies. According to the most modern accounts, the small and middle hordes swear fidelity to the Emperor of Russia by their deputies, but they do not acknowledge themselves his subjects, nor pay him any tribute ;[l] Russia, on the contrary, gives them annual presents. The caravans from Bukharia, Khiwa, and Tashkent, pay a duty for passing through their territory and under their escort.

The middle and little hordes are reckoned to contain 30,000 families each. If we suppose the great horde to contain 60,000, the population of this wide region may be estimated at 1,200,000 souls.[m]

[a] The Kirghis occupy the snowy mountains, (Belur Tag,) between Fergana and Kashgar, and are partly tributary to the Khan of Fergana. (Moorcroft's papers.)—P.

[b] Nicholas Rytschkow's Account of a Russian Expedition, in Busching's Geogr. Magas. VII. 422, 451. Bardanes, quoted in Georgi, I. 157, &c.

[c] Pallas, I. 618, 4to. N. Rytschkow's Topography of Orenburg, in Busching's Mag. VI.

[d] Pallas, I. p. 630, &c. 4to.

[e] "80 versts."

[f] Bardanes. N. Rytschkow, l. c. Pallas, Neue nord. Beytræge, II. 6.

[g] "Aigle doré."

[h] N. Rytschkow. Mag. Geogr. VII. 48, and VIII. 461.

[i] Pallas, I. p. 620.

[k] The language of the Kirghis having been recently referred to the Mongol, by M. Schmidt of Petersburgh, M. J Klaproth has shown it to be decidedly a Turkish-Tatar dialect ; so much so, that he was able to communicate with them, by using the dialect of Constantinople. The Kirghis, although a Tatar tribe, have a disagreeable physiognomy and form, somewhat resembling the Kalmuck. The tribes of Kaptchaks and Turkmans, adjoining them on the S., are a handsome and well made race.—P.

[l] Le Nord littéraire d'Olivarius, 1799. n. X.

[m] This is the statement in the original; it is also added, reckoning six individuals to each family, which would give only 720,000 to the whole nation. There must have been a mistake in the original; as the number there given is at the rate of ten for each family.—P.

Depressed by no despotic yoke, and abundantly provided with the necessaries of life, the Kirghisians are much happier than is generally supposed. They live on the flesh of their sheep, and the milk of their mares. Armed with lances and matchlocks, they pillage all the neighbouring countries. They are not blood-thirsty, but they employ in their marauding excursions an address which gives no small trouble to the Russian garrisons. They delight in carrying off the Kalmuk women, because they have the reputation of preserving heir youthful attractions to an advanced period of life. Though indefatigable marauders, they live on the most friendly terms with one another. They keep in their service slaves whom they have carried off from their neighbours. They wear the Tartar dress, with wide drawers and pointed boots; their heads are shaved, and covered with conical caps. The trappings of their horses are richly ornamented. The women dress their heads with heron's necks, so placed as to have the appearance of horns. Valorous and ferocious horsemen, the Kirghisians are fond of games, exercises, and horse-racing. At the funerals of the rich, horse-races are held, and the heir distributes slaves, camels, horses, magnificent harness, and other prizes, among the victors. They cross the rivers on bridges formed of rush-mats rolled together, and joined by two tight ropes. Their white gun-powder, the process for making which they keep secret, is a subject deserving of further investigation.[a]

About the beginning of the seventeenth century this people, formerly Shamanians, was converted by the preaching of the priests of Turkestan, and submitted to the Mahometan rite of circumcision. But in 1769 Pallas found them addicted to all the extravagancies of magic. They hold the dead in great honour, and every year celebrate a festival to their memory.

The Kirghisians have some trade with the Russians, of which Orenburg is the emporium. The middle horde goes as far as Omsk in Siberia. They are supposed to take 150,000 sheep every year to Orenburg; and they furnish also a great quantity of horses, cattle, lambs, furs, camlets, and camels' hair. Sometimes they bring Persian or Turcoman slaves. They take home in exchange various articles of manufacture, particularly cloths and furniture. Being refused any arms or armour in Russia, they obtain these from Bukharia and Khiwa, in exchange for camels and black cattle.

To the south of the country of the Kirghis, we have a labyrinth of minute divisions, generally not well known. The whole country which extends along the two banks of the Iaxartes as far as the Ak-Tau chain of mountains was comprehended under ancient Turkestan, a division known to Moses of Chorené in the fifth century by the same name and that of Turkhia, and which perhaps corresponded to the famous Turan of the Persian and Arabian writers. This western Turkestan was distinguished from another called the eastern, and which seems to have included a part of the Kalmuk country and of Little Bukharia.

According to the eastern geographers, Turkestan included the province of Fergana, which contains the towns of Andegan, Achsikat, and others, on the Upper Sihon; that of Osrushna, with a town of the same name; that of Ylak, or Ylestan, in which the river Tankat flows and joins the Sihon,[b] and which contains the scite of Otrar, the ancient capital, not far from the ruins of Iessi, a capital still more ancient, corresponding perhaps to the Isseden Scythica of the Greeks;[c] and lastly, Al-Shash,[d] which was prolonged to the mouth of the river Sihon. In modern accounts these divisions are almost unknown. Turkestan is at present represented as a small country, watered by the river Karasoo, which falls into the Syr. The land is fertile in cotton, millet, wheat, and chesnuts, but indifferently cultivated. Here the venomous spider already mentioned is found, and a species of lizard with legs a quarter of an ell in height.[e] The town called Turkestan and Taras contains 1000 brick houses. Here a Kirghisian prince lately reigned.[f] The capital of the rest of the country is Tashkent situated on the banks of the Syr or Sihon, and said to contain 6000 houses. Its inhabitants have a little trade; they cultivate peaches and vines, wheat, cotton, and silk; they have only three months of winter weather; their mountains contain gold. The state is governed by a khan, elected by the people out of the reigning family. This prince is generally a sort of humble vassal to the Kirghisians, whose nomade troops overrun the territory of Tashkent. The canton of Kokani, to which the Russian caravans have just penetrated, seems to be identical with the Kogend of our maps.[g]

The Karakalpaks also inhabit the banks of the Sihon. They call themselves Kara-Kiptchaks, *i. e.* the black or tributary Kiptchaks. They are a tribe of the Tartars of Kiptchak subjugated by the Kirghisians. They are divided into an upper and a lower *oolooss* or horde. In 1742 the lower horde, consisting at that time of 15,000 families, sought the protection of Russia, or the *White Czar*, and were almost annihilated by the Kirghisians for calling in foreign aid. The chiefs of the Ooloosses pretend to be descendants of Mahomet. They have also a sort of nobility. Their mode of living resembles that of the Bashkeers in Russia. They have a fixed place for their winter cabins, while the summer ones are moveable. They conjoin agriculture with the keeping of cattle. Possessing few horses, they employ their horned cattle for the draught and the saddle. They practise

[a] N. Rytschkow, l. c. 429.

[b] Abulfeda, Descript. Chorasmiæ et Maweralnaræ, p. 50, &c. (Geog. Min.)

[c] Hadgi-Khalfah, p. 908.

[d] "Al-Chaje."

[e] Arapow, a Russian interpreter, in Busching's Géog. Mag. VII. 48.

[f] Rytschkow, Topography of Orenburg, in Busching's Géogr. Mag. V. 472, &c.

[g] Fergana, on the upper part of the Sihon, (Syr-daria,) is one of the largest and most powerful states of Independent Tartary. Its present ruler is Ameer Khan. He has 10,000 cavalry, and 30,000 other troops; but these are required to be in the field only one month in the year, the cavalry three. Several nomadic tribes are his tributaries, viz. the Kirghis, Turks, Kapchaks, Meng, and Kassacs. The prevailing language is Turkish. His stationary subjects are Tajiks. His territories are bounded E. by the Belur-Tag, which separates them from the Chinese territories; S. by the Ak-Tag; and N. by the Andegan Mountains, and the Sandy Desert, beyond which are the Russian Karakalpacs and Kassacs. There are 12 cities, among which are Kokan, (Kokend, or Cogend,) the capital, a large city on the Sir, without walls; Merghilan, once the capital, celebrated for its silk and shawl-wool, Mengtappa, in the country of the Turks and Kapchaks, a handsome race of 12,000 families; Ardanch, occupied by the Badakshanys, noted for its gardens; Andegan, once the capital, now in ruins; and Osh, formerly the capital also. (Moorcroft's papers.)—P.

several trades with success. They sell knives, sabres, muskets, cooking-pots, and gunpowder, to their neighbours. They are Mahometans, and well instructed in the precepts of their religion. The power of the khans is much limited by the influence of the *khodshas* or priests.

The Trukmenes, or Turcomans, inhabit all the eastern coast of the Caspian Sea, a sandy and rocky country, labouring under a great deficiency of water. The Mogulshar mountains, or those of Mangishlak, have no great elevation, but are very steep, and intersected with ravines. Towards the Caspian Sea they present limestone rocks full of shells, with strata of chalk, marl, and clay, several springs of naphtha and petroleum, and some indications of lead and of copper.[a] On the shore conglomerated masses are found, consisting of shells and sand, united by a stony cement, or by bitumen. At a greater distance from the sea these masses are completely petrified. The waters are salt or brackish. The vegetation of these countries is limited to a few species, among which the *Salsola orientalis* is distinguished by its stiff and prickly appearance.[b] The *Absinthium ponticum*[c] and caper shrub are in abundance. The *Rhamnus alpina* is employed as fire-wood. Foxes, wild-cats, sheep, and camels, are the animals most generally diffused. The ounce, and even the tiger, according to some accounts, are now and then seen. The country swarms with insects, particularly butterflies and locusts. In the gulphs and bays the *Nereis noctiluca* is sometimes seen emitting its phosphoric light.

The Turcomans, more swarthy, smaller in size, but more square in the limbs than the other Tartars, live in tents, or in caves of the rocks. They are a set of rude shepherds, who, at times, commit acts of robbery. They are divided into several hordes, under the conduct of Kirghisian chiefs. The Russians divide them into two nations, or rather two parties: that of Mangishlak, consisting of 2500 or 3000 families, and in which the principal tribe is that of Abdallah. The other is that of Astrabad, or the Persian party, in which the powerful tribe of the Takeiaumoot is conspicuous. It amounts to 12,000 families, and possesses the territory round the Gulph of Balkan. The Turcomans keep numbers of camels and sheep; their mutton is excellent. They weave a coarse cloth of camel's wool. They raise a little wheat and rice, with melons and cucumbers. Their dress, their arms, and their equipage, exhibit a mixture of the Tartar and Persian costume. They live in tents of felt. Their chiefs and elders possess but little authority. Mangishlak was once a town, but at present nothing is to be seen at that place but temporary barracks, in which the Russian merchants are lodged. The harbour is one of the best on the Caspian Sea. The bay of Balkan is also frequented by Russian vessels; the neighbouring islands produce a little rice and cotton; that of Naphthonia contains a great quantity of naphtha, the vein or stratum of which seems to cross the Sea in a north-westerly direction to Baku. These islands, inhabited by Turcomans, possess several harbours, and might be made the site of a trading factory.[d] Collectively taken, they are called Ogurtchi, which is also the name given to the adjoining coast, and signifies a country of cucumbers.[e]

To the south of the lake Aral, our eyes, after being fatigued by the view of unvaried deserts, find repose in surveying a country somewhat more fertile, called by the Arabs Khowaresm, Karissim by the Tartars and Russians, and *Chorasmia* by the ancients. It also bears the name of Khiwa, which is that of its chief town. In the twelfth century the Turks of Karissim were in possession of a powerful empire. This state is now almost reduced to the province of Khiwa, which a man on horseback may ride over in three days. The eastern geographers speak of Kharizmia as a cold country in comparison with Persia. The river Gihon is frozen every year.[f] According to the Russian accounts the air is temperate; the frosts last only a few days; snow seldom falls, and soon melts. In summer there are no oppressive heats, but the autumnal months are rainy.[g]

The Weisluka mountains, a branch of the Ak-Tau, occupy a part of eastern Khowaresm. They contain gold and silver mines, which were formerly worked, but the traces of which are not at present allowed to be investigated. It is said, that emeralds, sardonyxes, and other valuable stones, are also found there. The greater part of the country consists of plains; the soil is generally composed of a reddish clay, and is adapted to all sorts of crops; but the deserts of moving sand which encircle the frontier sometimes invade considerable portions of land.

The large river Gihon, or Amoo, which crosses this country, is, according to the historians of Alexander, six or seven stadia broad, even in the upper part of its course. It is too deep to be forded.[h] A similar description of it is given by the Arabian geographers; the latter speak of inundations occasioned by it. When it arrives at the base of the Weisluka mountains in Khowaresm, the Gihon is separated into several canals of irrigation, preserving two principal branches. The small arm of the Gihon is the only one which always contains water. The other, when the water is high, spreads over a marshy flat, through which it passes, and, like all rivers which are not confined to their channel, it is sometimes left dry in many parts of its course.

Among other articles, this country produces wheat, barley, *Holcus sorghum*, or Bukharian millet, and *tchegura*, a species of rice; pease, beans, lentils, hemp, tobacco, cotton, and the Persian *kushut*, a plant which yields oil; all sorts of fruits of a most excellent flavour, mulberries, and vines in abundance. The grape ripens well; but they observe their religious precepts too strictly to make any wine. Numerous herds of cattle are seen wandering in magnificent meadows; but there is little pasture adapted for horses.[i] Domestic fowls are common, and game is very abundant.

The inhabitants of the country are Tartars of diffe-

[a] Gmelin, Rytschkow, and Falk, quoted by Georgi.
[b] Gmelin's Travels, IV. plate 5.
[c] Properly *Artemisia Pontica*. – P.
[d] Gmelin, vol. IV.
[e] Wahl, Asien, &c. 1. 557.
[f] Ibn Haukal, apud Abulfeda, Descript. Chorasm. p. 23. Geogr. Græci minores, t. III.
[g] Ephémérides Géogr. de M. Bertuch. vol. XXV. p. 108
[h] Arrian, III. 29. Strabo, XI. 509– 518, ed. Alm.
[i] Rytschkow, Topography of Orenburgh, in Busching's Hist. and Géogr. Mag. V. 470.

rent tribes, chiefly Uzbeks and Turcomans; together with Bukharians, who are divided, as in Bukharia, into Sarti, or traders, and Tatchik, or common people. The Bukharians are the real indigenous people of the country.[a] The Tartars give the Bukharian inhabitants of the state of Khiwa the name of Urgenetch,[b] from their ancient capital.

Khowaresm is divided into two states, at present independent, that of Chiwa or Khiwa, and that of Konrat, or of the Aralians.[c]

The state of Khiwa reckons, on a territory of about 4600 square miles,[d] a population of 200,000 or 250,000 souls. At the head of the government is a khan, who holds a court splendid enough for a Tartar prince, but possesses a mere semblance of authority, and whose functions consist in affixing the seal of state to all the public acts presented to him. The real power is in the hands of the *inak*, the president of the divan, or council of state. This council is formed by the great officers of state, who obtain their places by the suffrages of the people.[e] The moolla-bashi, or head of the doctors of the Mahometan law, also exercises great authority; and it is not very rare for the khan to perish by assassination or by poison.[f] The indigenous dynasty having been extinct for half a century, the inhabitants of Khiwa have elected their khans from the princes of their neighbours the Kirghis. The armed force of Khiwa may amount to 20,000 men, including Turcomans and Uzbeks in the pay of the khan. This army chiefly consists of cavalry; their arms are bows, lances, and sabres. They are rarely seen with muskets, and such as they have are matchlocks.[g]

The inhabitants of Khiwa, or, as the Russians denominate them, the Khiwintzes, live in a tolerable state of civilization. According to Al-Bergendi, they evince more natural genius than the other Tartars. They are fond of poetry, and show, from their earliest age, a turn for music. We are told that there seems to be a musical cadence in the very cries of their infants.[h] Abul-Ghazi, prince of Khiwa, has given us a history of the Tartars. These people cultivate their lands with care; they raise silk worms and make stuffs of silk, of cotton, and of mixtures of the two. These stuffs are weaved by the women in their houses. None of them are made in the European manner.

The caravans of Khiwa carry to Orenburg wheat, raw cotton, silk and cotton stuffs, robes embroidered with gold, ready made and called *shalati*, lamb's skins, and sometimes Persian and Indian coin.[i] In Russia they buy the products of European manufacture; and from the Turcomans, horses, cattle, and sheep. Khiwa is still a great slave market. The foreign trade of this state is valued at 300,000 rubles, or 46,000*l.*[k]

The city of Khiwa is on a canal from the Gihon, surrounded with a ditch, a clay wall, and a rampart. It has three gates, a castle, thirty mosques, and a college.[l] The houses are 3000, built of clay in the manner of the country; the inhabitants are reckoned 10,000. The neighbourhood is filled with orchards, vineyards, cornfields, and populous villages.[m] The whole canton of Khiwa contains a population of 60,000 souls.—The new city of Urghenz, thirty miles[n] north from Khiwa on the same canal, contains twenty mosques, 1500 houses, 5000 inhabitants; and in the canton belonging to it there is a population of 55,000.—Shabat and Ket are two small towns, the one containing 2000 and the other 1500 inhabitants.—Anbari has only 1000, but its canton 41,000 souls. The canton of Shanka has 27,000, of whom 2000 belong to the town.—Azaris, probably the Hasarasp of Ibn Haukal, contains 1500 inhabitants, and its canton altogether 11,500.—Hurlian, a very small place, is a kind of fortress; its canton is very thickly peopled, and contains 16,000 inhabitants. This population,[o] concentrated within a space of from fifty to eighty miles[p] long and broad, would become a powerful state if it were possible for a European colony to establish itself in the midst of people so strongly attached to the Mahometan religion.

The Aralian Uzbeks, who possess the plains adjoining lake Aral, take also the name of Konrat, after their chief town, which is, more properly speaking, their winter encampment. This camp has a circumference of fourteen miles.[q] It is defended by an earthen rampart twelve Russian ells in height. In cases of necessity the gates are defended by *chevaux-de-frise*. Manhuf and Kisil-Kosha are on the same plan on a small scale. Koptchak is a sort of fortress, in which a garrison of 1500 men is always kept. The Aralians, governed by two elective beks, are liable to the state of Khiwa in an annual tribute of 2000 ducats, (L.250.) But they do not pay it except when they are not at war with the Khiwintzes, a thing which happens almost every year. Along with the Karakalpaks and Turcomans who live among them, they may form a mass of 100,000 souls. These people, who are half nomadic, have a considerable produce from their flocks, to which they add something by fishing and hunting.

The finest provinces of Tartary remain to be described. They are generally comprehended under the name of Great Bukharia.[r] But the limits of this country on the north and west vary with the power of the Uzbeks, who are its masters. It is that part of Great Bukharia which is situated on the north of the Gihon, or Oxus, that was formerly celebrated under the names of *Transoxiana* and *Maweralnahr*, names extended to the whole of Turkestan.

The most celebrated and the most fertile of all the provinces is that of Sogd, so named from the river which flows through it. "For eight days," says Ibn-Haukal, "we may travel in the country of Sogd through one delicious garden. On every side, villages, rich corn fields, fruitful orchards, country houses, gardens,

[a] Hist. Gén. des Tartares, p. 515.
[b] Rytschkow, l. c. 468.
[c] Annales des Voyages.
[d] "600 square Fr. leagues."
[e] Ephémérides Géogr. XXV. 109.
[f] Rytschkow, l. c. 469.
[g] Ephém. Geogr. p. 110.
[h] D'Herbelot, Biblioth. Orient.
[i] Georgi, Descript. de la Russie, III. 517.
[k] "1,200,000 francs."
[l] "*Medressi*."
[m] Ephemer. Geograph. XXV. 110.
[n] "11 Fr. leagues."
[o] 214,000.
[p] "20 to 30 Fr. leagues."
[q] "5 Fr. leagues."
[r] Pronounced Bookhara.

meadows intersected by rivulets, reservoirs, and canals, present a most lively picture of industry and of happiness." The rich valley of Sogd produced so great an abundance of exquisite grapes, melons, pears, and apples, that they were exported to Persia, and even to Hindostan.

Samarcand, considered as the capital of Great Bukharia, stands on the south bank of the Sogd. We have no recent description of this celebrated city, which seems to have lost much of its lustre since the days of Timur, when so many fetes animated the imperial palace, the city, and the beautiful surrounding country. It appears that towards the beginning of the last century Samarcand was fortified with ramparts of tufa; that the greater part of the houses were built of hardened clay, and some of them of stones from the neighbouring quarries.[a] The khan of Great Bukharia encamped in the adjoining meadows, and the citadel was almost in ruins. The silk paper made here was peculiarly fine, and in much request all over the east; and it is said that this is the place where it was first invented. Ibn Haukal tells us that the manufacture was known about the year 650.

"I have been," says this eastern geographer, "at Kohendiz, the ancient castle of Bukhara. I have cast my eyes all round, and never have I seen a verdure more fresh or more abundant, or of wider extent. This green carpeting mingled in the horizon with the azure of the skies. The simple verdure served as a sort of ornamental offset to the towns contained in it. Numerous country seats decorated the simplicity of the fields. Hence I am not surprised that of all the inhabitants of Khorasan and Maweralnahr, none attain a more advanced age than those of Bukhara."[b] The city of Bukhara, or Bokhara, situated on the same river Sogd, has often disputed with Samarcand the title of capital. When the English commercial agents, in 1741, visited this city, which stands on the side of a hill in the form of an amphitheatre, they found it large, populous, and governed by a khan. The inhabitants manufactured soap and cotton stuffs; they cultivated rice and bred cattle. From the Kalmuks they received rhubarb and musk; lapis lazuli, and some other precious stones, from Badakshan. They had gold and copper money. The people were civilized, but deceitful. The soil, says the Turkish geographer, is so fertile, that a field of one or at most two acres,[c] which he calls *dumen*, is amply sufficient to maintain a family.[d]

The eastern part of Bukharia is a very mountainous country. The provinces of Vash, of Kotlan, and of Kilan, extend toward the Beloor mountains. Among other towns is that of Badakshan on the Amoo. In the last century, this city belonged to the khan of Great Bukharia, or rather of Samarcand. Badakshan was small, but well built and populous. Its inhabitants were enriched by the gold, the silver, and the rubies found in the neighbourhood. The mountain streams, which ran when the snow melted in the beginning of summer, carried along with them a large quantity of gold and silver in grains. Many of the caravans, bound for Little Bukharia or for China, take this city on their way. Others prefer the road through Little Thibet, on the east side of the mountains. Ibn Haukal relates, that the territory of Badakshan not only contained mines of rubies and lapis lazuli, but that it produced a great quantity of musk. Termed is a large town, built of brick.

The provinces of Balk, now in the hands of the Afghâns, of Tokarestan, and of Gaoor, lie on the south side of the river Amoo.

The interesting country which we have now gone over is the famous *Maweralnahr* of Arabian and Tartar history. There stood the throne of Tamerlane. There the ambassadors of all the sovereigns of the world came to pay their respects to the chief of the Mongols. In 1494, Sultan Bauber, a descendant of Timur, driven with his Mongols from Great Bukharia, penetrated into Hindostan, where he founded the Mogul empire. The victorious Tartars, called the Uzbeks, established a powerful monarchy in Bukharia, which continued from 1494 to 1658, when this extensive and fertile country appears to have been divided into several states, under the authority of their respective khans.

The Uzbeks first crossed the Iaxartes about the beginning of the sixteenth century, and pouring on the possessions of the descendants of Tamerlane, soon drove them from Bukharia, Khowaresm, and Fergana.[e] They now possess this country, and it is said that they are to be found beyond the Beloor mountains, as far east as Koten, if not farther. They belong to the Turkish race. Their government is very different from that of the Afghâns. In Bukharia and Fergana at least, every thing is in the hands of the sovereign: there is no vestige of popular government, and scarcely any trace of aristocracy. Their division into tribes has no relation to the government, and there are no separate jurisdictions or assemblies even in the wandering hordes. The country is divided into districts and sub-districts, under officers appointed by the sovereign, who collect the revenue and dispense justice. There are, however, village governments, in which the heads are appointed by the king, at the recommendation of the richest inhabitants. In the army also, every thing depends on the appointment of the government. In Bukhara, the men are said to be arranged in messes of ten each, who have a tent, a boiler, and a camel among them. The Ulema, or members of the church, enjoy, however, a considerable influence not derived from the government. The Uzbeks having probably had few institutions of their own at the time of their conversion to Islâm, have adopted the provisions of the Mahomedan law in its utmost detail, applying it to every part of their civil government, and even of their private conduct. The revenue is collected exactly in the proportions directed in the Koran, and one tenth of its produce is applied to alms. Justice is administered by the Kauzee in strict conformity to the Shirra: and the use of wine or even of tobacco is as strictly forbidden and almost as severely punished as fraud and robbery. The king of Bukhara's title is Commander of the Faithful. Part of every day

[a] Bentinck's Preface to the Translation of the History of the Tartars by Abool-Ghazi.

[b] Eastern Geography, translated by Ouseley, p. 300.

[c] "*Arpens.*"

[d] Hadgi-Khalfa, p. 844. Herbelot, Biblioth. Orient.

[e] See Elphinstone on the kingdom of Caubul, p. 465, &c.

is spent by him in teaching the Mahomedan religion, and the greater part of every night in prayers and vigils. He reads prayers in his own mosque, and often performs the funeral service for people of low rank; and Killich Ali Beg, the present ruler of Bâlk under the king of the Afghâns, a prince at this moment celebrated and adored all over the east for the singular excellence of his character, always walks when in the street, lest, if he rode, his feet should happen to be higher than the heads of other true believers. The present ascendency of the king of Bukhara over the tribes is the result of a long exertion on the part of the government in dividing and mixing the various tribes, and keeping the great men from all employments which might strengthen the influence derived from their birth. The same power of the government has been promoted by the influence of the Mollahs, and facilitated by the comparatively level nature of the country. Hence the tribes which inhabit the hilly country of Hissar and the marshy one of Shekr Subz, being inaccessible to the cavalry of the king, have defied his power. The Uzbeks are generally short and stout men; they have broad foreheads, high cheek bones, thin beards, small eyes, clear and ruddy complexions, and generally black hair. Their beauty, so much dwelt upon by the Persian poets, figures chiefly from a comparison with the aspect of the Mongolians; their dress is a shirt and trowsers of cotton, a tunic over it of silken or woollen cloth bound with a girdle, and over this a gown of woollen cloth, pasteen, or felt. The head is covered with a white turban, worn in general over a calpauk. Both men and women wear boots at all hours, and bandages round their legs instead of stockings, and every man has a knife hanging from his girdle, and a flint and steel for striking fire. The women have a similar dress, but longer, with a silk handkerchief tied over their head, and their hair plaited into a long queue, which hangs down from the middle of the head like those of the Chinese; they wear gold and silver ornaments, and over all throw a sheet of silk or of cotton.

The opinion commonly entertained of the ferocity and barbarism of the Uzbeks, is partly owing to their being confounded with the Kalmuks; the discreditable practice of selling slaves is not confined to them; but their laws of war are certainly most barbarous; they give no quarter to any enemies, except Sheeites or infidels, whom they can sell for slaves, (for men are sold in Bukhara like cattle,) but in other respects their character does not appear to disadvantage, on a comparison with other Asiatics; they are said to be comparatively sincere and honest; they have few quarrels among individuals, and scarcely any murders; and there are few countries in the east where a stranger would be more at ease. They are far from being savage Tartars, wandering over wild and desolate regions. The city of Bukhara is equal to Peshawer in population, and superior to any town in England, except London. It contains numerous colleges, capable of accommodating from sixty to six hundred students each, and which have professors paid by the king, or by private foundations: it abounds in caravanseras, where merchants of all nations meet with great encouragement, and, though the prince and people are above all others attached to their own belief, they fully tolerate all religions. A mussulman proselyted by any other sect, is, indeed, never forgiven; hence we are informed in some recent missionary publications, that an Arabian convert to Christianity, denounced by his intimate friend a few years ago, suffered martyrdom in that country.

The Uzbeks, who probably have lived in this country, though not as conquerors, ever since the third or fourth century, have not however effaced all traces of a more ancient race of inhabitants. These are named Taujiks, and are handsomer than the Tartars, both in elegance of form and agreeable expression of countenance. They approach to the people of Little Bukharia, whom they also resemble in their dress. The clothes of persons in easy circumstances are in a great measure of silk and furs. The long robes of the women exhibit wide and varied plaitings; they adorn their hair with braids of pearls. The Bukharians lead a frugal life, their food consisting chiefly of rice, wheat, millet, and, above all, fruits, such as melons, grapes, and apples; they are fond of horse flesh, but as it is expensive, beef is more generally used. They use a great deal of the oil of sesamum. Tea flavoured with anise, and the juice of grapes,[a] are their favourite drinks. They intoxicate themselves with opium. Their bread is unfermented. The Bukharians carry no arms. The Uzbeks, on the contrary, are not strangers to the use of the musket; and it is even said that their wives, who in beauty surpass the other Tartar women, follow their husbands in war, and fight by their sides.

They speak the Zagatayan language, which is the Turkish or Turcoman. But the idiom of the Bukharians, which promises a fund of curious research, has not yet been analyzed; several geographic terms have been observed in it, which appear to be of Persic or Gothic origin.

Our information on the state of the population is hitherto vague. This country can probably, in a case of necessity, muster 80,000 armed men. According to Hanway's account of the revenues of Nadir, Khorasan furnished nearly a million of pounds sterling[b] annually; and the revenue of Great Bukharia may be believed at least equal to that of Khorasan. But the income of the khans is derived more from their estates and their flocks than from any taxes.

Ibn Haukal, the father of Arabian geography, has given us the following lively picture of the manners of the people of Bukharia in his time.

"Such is the liberality of the inhabitants, that not one of them will decline the duties of hospitality. If a stranger arrives among them, they croud round him; each one wishes to have him; they dispute for the privilege; and he who obtains it becomes an object of envy. Every one, though possessing nothing more than his own necessities require, will carry to the door of the cabin in which the stranger is received a part of the fruits of his labour. The generosity of their hearts thus finds riches in the very bosom of poverty. When I was in the country of Sogd, I saw a great building like a

[a] "*Moût*," sweet or unfermented wine.—P.

[b] "Twenty-four millions of francs."

palace, the gates of which were entirely open, and fixed back to the wall with large nails. I asked the reason, and was answered, that that house had not been shut, night or day, for more than a hundred years. Strangers, in whatever number, may present themselves there at any hour. The master has made abundant provision for the reception of the men and their animals; he is never happier than when his guests stop for some time. Nothing of the kind have I seen in any other country. In every other place, the rich and powerful lavish their treasures on the caprices of luxury, or on favourites whose whole merit is to be equally corrupt with themselves. The inhabitants of Maweralnahr make a more rational use of their economical savings. They build caravanseras, bridges, and other works of public utility. In Maweralnahr, you will not arrive at any town in the most gloomy situation, even in a desert, without finding the relief of an inn, or house of entertainment, furnished with every thing that a traveller can require. The glory of Maweralnahr cannot be effaced by that of any other country. It has produced great monarchs and able captains. No people in the Mussulman world excels them in courage Their number and their discipline gives them the advantage above other nations, which, on the defeat of one army, find it impossible, for a long period, to raise another for their defence. If such an event occurs in Maweralnahr, one tribe is always ready to repair the losses of another."

The civilization which was introduced with the Mahometan religion among this people has been somewhat obscured, along with their declining power and their glory.

The reports of the Russians who have penetrated to Khiwa and to Bukhara seem to show that a Christian traveller finds here insurmountable obstacles in the fanatic intolerance of the Mussulmans. But from the more recent accounts of Mr. Elphinstone, it appears that this intolerance has either been exaggerated, or is since mollified. Christians at least visiting that country from India are in no degree ill treated.[a] [b]

[a] Bucharia (Bokhara) is bounded N. by the desert of Kirguis-Kaissatsk, E. by the Belur-Tag, S. by the Amou or Gihon, and W. by the desert of Khiwa. It was conquered by the Mongols in the 13th century, and by the Usbeks, (nomades of Dacht-Kiptchak or the Kirguis deserts,) in the 16th century. The principal rivers are the Amou-daria, (Gihon,) which has six main branches, and two mouths; the Syr-daria, (Sihon,) which has three mouths; and the Zar-Efshan, which flows by Bokhara into the Lake Kara-Koul. The present ruler of Bucharia is Emir Gaider; Bokhara, his capital, is situated in a plain, on a canal communicating with the Zar-Efshan; it is walled with bricks, and contains 360 mosques, 75 colleges (medressi), 2000 mollas, 4550 students, and 249,250 inhabitants, of which only 1200 are Jews. The stationary inhabitants, or native Bukharians, are Tajiks, who speak a dialect of Persian. The early nomadic tribes are called Iloti, including the Djagatai Turks, Kazvins, and Aimaks. They speak the Turkish language. The Usbecks, now the ruling people, issued from the N. deserts in the 16th century. They are divided into 90 tribes, and consist of 100,000 families. The tribe of *Emir Gaider* is called *Karamangatsky*. The Turkmans, (Turkmentsi,) a nomadic race, occupy the western districts along the Amou. There are in the country, 5000 families of Arabs, 1000 Afghan soldiers, and 40,000 Persian slaves.—*Novaroff*, 1813.

During Mr. Moorcroft's visit to Bokhara, Oorgunj, Shuhr-Subz, a mountainous district E. of Bokhara, and the Kothai-Kapchaks, were in a state of revolt. The present ruler, Emir Gaider, (Mir Hyder,) is said to be mild and benevolent, and very learned in the Koran and Mahometan law. He himself administers justice, and maintains a very severe police. About one third of the population are slaves. There are many Russians brought there as slaves from Khiwa, some of whom were liberated by Moorcroft.—P.

[b] The Russians have recently sent embassies to the three principal states of Independent Tartary, the Khanats of Bokhara, Khiwa, and Khokand or Fergana. M. Nazaroff proceeded, in 1813, from Petropaulofsk, in Siberia, across the Steppe of Issim and the desert of the Kirghis to Khokand. No important objects were effected by this mission. The khan of Khokand, besides possessing the country on the Sir, is said to have extended his authority over Samarcand. In October, 1820, an embassy proceeded from Orenburgh, with a numerous retinue, across the deserts N. and E. of Lake Aral to Bokhara. They first crossed a saline and argillaceous plain, abounding in marine remains, and extending 250 miles to the Monghodjar hills, a range composed of porphyry and green stone, and rising in some instances to a thousand feet above its base. They then traversed a sandy desert of 250 miles to the Sir, which they crossed on the ice near its mouth. This river divides into numerous branches, intersecting a delta about 60 miles wide, and commencing about 200 miles from its mouth. The Djan-deria, formerly the principal branch, has been choked up by sand, and now forms a line of jungle. South of this delta is the sandy desert of Kisil-coum (red-sand) extending 300 miles E. and W. by 70 or 80 N. and S. to the foot of a range of mountains of no great elevation, but covered with snow in December. Beyond these was a strip of sand 20 miles wide, when they entered on the cultivated territory of Bokhara. The city of Bokhara is said by M. Meyendorff, who has published an account of the embassy, to have 8000 houses, and 70,000 inhabitants, three fourths of whom are Tadjiks, or Persians; 800 houses are said to be occupied by Jews, who are treated with great indignity. He states the whole population of the province of Bokhara at 2,478,000; of these 1,500,000 are agricultural; the remainder are inhabitants of the towns, or nomadic. The cultivated territory he estimates at 300 square miles. His account of the population is probably greatly exaggerated. The mission failed in attaining its object, and returned in March, 1821. In 1819, Capt. Mouraviev was sent on a mission from Georgia to the khan of Khiwa. He proceeded from the Bay of Balkan, across the desert of the Turcomans, which occupied him 16 days in passing to the frontiers of Khiwa, where he was detained 48 days in the fortress of El Gheldi. He was then released, and proceeded to Khiwa, where he had an interview with the khan, but without effecting any object. The territory of Khiwa is about a hundred miles square, with a population of 300,000. Khiwa itself has 3000 houses, and 10,000 inhabitants, evidently an erroneous statement. There are said to be 30,000 Persian and 3000 Russian slaves in the territory of the khan.—P.

BOOK XXXVII.

SIBERIA.

Physical Description of the Country.

The style of our descriptions necessarily varies with the nature of the different countries that come under our view. There are some, as Turkey in Asia, where a great difference of elevation brings together into a narrow compass different climates, productions, and even different races of inhabitants distinct and opposite in their character. There are others where the predominance of the same physical causes over an immense territory creates a continual repetition of the same phenomena. Siberia, or northern Asia, is of this last description. Besides, while we were engaged with Syria and with Asia Minor, we were obliged to direct our attention to cities celebrated in the annals of the world. Even in Persia a small province often presented some historical interest. Here we have no such temptation. In Siberia we are without the limits of history. None of the objects in this region derive an illusory grandeur from the recollection of events long passed; nature, savage, rugged, and stubborn, still predominates over the early efforts of civilization. These vast regions may therefore be united in one physical portrait. We can glance rapidly over their topography, which is well known, being completely detailed in German and Russian works.

The ancient Greeks and Romans extended their imaginary Scythian Ocean over the space occupied by Siberia. Ptolemy, better informed, says that a vast unknown region lay to the north-east of the Caspian Sea; but the utmost extent of ancient geography scarcely reached the Uralian mountains. In the middle age, travellers, and among others, Marco Polo, heard the Tartars speak vaguely of a country which was rich in furs, but covered with perpetual darkness. In 1242, the Tartars founded on the banks of the Irtish and the Obi, a *Khanat*, which from its capital, took the name of *Sibir*, and from a neighbouring river, that of *Tura*. The name Siberia is almost identical in pronunciation with the Russian word Seweria, or country of the north, the letter *b* in that language being pronounced like *w*;[a] but the two terms have nothing in common in their actual etymology. The conquest of that kingdom by the Cossacks was followed by a series of discoveries,[b] which extended the Russian power and our geographical knowledge to the eastern extremity of Asia. The name of Siberia was vaguely applied to all these newly discovered countries; it was even extended to the Tartar kingdoms of Astrakan and Kasan, long before incorporated with the Russian empire in Europe. This vague use of the name ought to be banished from geography. On reading with a little reflection the plan of a description of the Russian empire, inserted in the memoirs of the Petersburgh Academy, we shall see that this learned society considered the Uralian mountains both as naturally dividing the Russian dominions into two parts, and as fixing invariably the true boundary of Siberia. Our standard geographical authors, as d'Anville in his beautiful map of Asia, Busching in his Geography, and Georgi in his statistical account of Russia, have concurred in restricting the denomination of Siberia to the countries situated to the east of the Uralian mountains.

Siberia thus defined, is bounded on the north by the Frozen Sea; on the west by the Uralian mountains, which separate it from Europe; on the south-west by the Algydim-Shalo mountains, which divide it from independent Tartary; on the south, by the Altaian, Sayanian and Daurian chains, which form the frontier of the Chinese empire; on the east by the Eastern Ocean and Behring's Straits, which separate it from North America. Its length from west to east cannot be reckoned less than 4000 miles,[c] and its breadth from north to south varies from 1100 to 1900.[d] Its surface is about five millions of square miles,[e] which is larger by two sevenths than the whole of Europe, though this division of the world should be extended to the Caspian Sea.

We proceed to describe its chains of mountains, its extensive plains, and its principal rivers.

The Ural, or Uralian mountains, which separate Siberia from European Russia, have a direction from north to south, for a space of eleven hundred miles;[f] their breadth varies from fifty to a hundred.[g] Possessing but little elevation at the northern extremity, between the lower Obi on the east, and the Usa, which runs into the Petshora on the west, they acquire a considerable height between the 60th and 58th degrees of north latitude, near Solikámsk and Werchoturia. They become low and flat in the latitude of Ekaterinburg; but acquire a new elevation in the country of the Bashkeers in latitude 54° and 55°. Pawdinskoe-Kamen has been found by trigonometrical measurement, to be 6819 feet[h] above the level of the Caspian Sea. Several of the summits of the Werchoturian mountains are covered with perpetual snow. We are not certain if this is the case with the Bashkeer mountains.[i] On the whole, the Ural forms a long plateau, 4000 or 5000 feet in height, on which mountains are raised from 1000 to 1500 feet in height. The structure of the northern part of the chain is little known. Limestone rocks seem to predominate. In Nova Zembla, the surface being covered with no pulverised soil, the

[a] More strictly like the English *v*, the *w* of the Germans.—P.
[b] See the Chronological Table of Discoveries in Siberia subjoined to Book XXXVIII.
[c] "1500 Fr. leagues."
[d] "400 to 700 Fr. leagues."
[e] "700,000 sq. Fr. leagues."
[f] "400 Fr. leagues."
[g] "20 to 40 Fr. leagues."
[h] "6397 Fr. feet."
[i] Georgi, Russie, I. 151.

structure is every where visible, and it perhaps may be regarded as a continuation of the Uralian formation. From 60° to 54° or 52° of latitude, they have been explored in detail in the working of mines. In ascending at Solikamsk, at Perm, or at Ufa, we first cross a chain of stratified hills, composed of sand-stone and calcareous breccia; then a chain of pure lime-stone rocks without organic remains; and, lastly, a chain of schistous mountains, principally formed of clay-slate, and horn-stone slate,[a] and containing immense quantities of iron ore, sometimes in veins and sometimes in masses. We come at last to the principal chain, which the Russians divide into the Werchoturian Ural, the Ural of Ekaterinburg and that of Bashkiria. Here granite makes its appearance every where in massive strata;[b] sometimes the constituents of that rock, particularly quartz, as at Dchigilga, are found in large masses in a separate state. A laminated granite, which the German mineralogists call gneiss,[c] is frequent on the east side of the chain; here, as on the west, we find as we descend, schistous mountains succeeded by others of lime-stone, but the respective limits of these strata are less precise, and there is a greater diversity of rocks and of minerals. Iron is always in the greatest abundance; the bed which is worked at Blagodad is 150 fathoms in thickness; there is one hill entirely composed of magnetic iron, called *Magnetnoï wisokogora*. These mountains also contain large quantities of copper, a little gold and lead, serpentine, jasper, and crystalline marble. The two lime-stone chains of the Ural are penetrated with numerous caverns, but the tunnels[d] so common and so extensive on the European side, as in the neighbourhood of Koongoor and of Perm, are not found on the Siberian side.[e]

The Ural range throws off various small chains at its southern extremity. The Obstcheï Syrt, which passes into Europe, falls to be described in another place. The mountains of Guberlinski, a branch detached from the Ural of Bashkiria, join on the east side the mountains of Ulu-Tau and Algydim-Shalo, which, as we have formerly seen,[f] separate the Kirghisian steppe from that of Issim. These high lands form a link of connection between the Ural and the plateau of central Asia.

All the mountains of the south part of Siberia, from the Irtysh to the west side of lake Baïkal, are only promontories or terraces, belonging to the central plateau, and the great chains with which it is crowned.[g] We must never lose sight of this leading principle, nor look for a connection between these little chains which has no existence.

The little Altaï is a lower terrace of the great Altaï; this last is entirely without the limits of Siberia; the former marks its extreme frontier;[h] it extends from the river Irtysh to the Yeniseï, allowing the Dshabekan, which is the beginning of the Obi, to pass across a narrow gorge. On the south, a wide plateau separates it from the great Altaï, and on the north a valley comes between it and the metallic mountains of Kolywan. Limestone rocks predominate in every part of the little Altaï that is known; it contains coralline marble. The traveller Schangin, who has seen the summits, found on them stratified granite.[i] The Russian mineralogists have observed in the same quarter rich mines of copper, lead, and silver, which might be worked in the event of the mines of Kolywan being exhausted.[k] One of the summits measured by the barometer, was found to be 5589 feet[l] above the hill of Schlangenberg, near the lake of Kolywan.

A granitic range given off from the little Altaï stretches northward between the Irtysh and the Obi; it rises into peaks 14 or 1500 feet above the neighbouring plains. This nucleus of granite has its sides all along covered with mountains of slate and limestone, which are rich in copper, with a mixture of silver and of gold; these are the metallic mountains of Kolywan. The heights which follow the Obi on its left to its junction with the Irtysh are called the Urman.

Between the Obi and the Yeniseï are the mountains of Kutznezk, in which clay-slate predominates; they contain powerful beds of coal, some of which are said to have burned for half a century, after being kindled by lightning. The circumstance of the kindling has probably been misunderstood or imaginary.

The Sayanian mountains, between the Yeniseï and lake Baïkal, are not so much a mountain chain as a plateau of rocks. Even the hunters scarcely ever visit this desert. Wachsmann, a surgeon who traversed it in quest of the genuine rhubarb, found it to contain a large quantity of granite.[m] The plateau is divided into two lines of mountains along the banks of the Yeniseï. One of them is named after this river, the other after the town of Krasnoyar. The principal mass consists of a red granite containing copper.

It is on the south-west of the lake Baïkal that Siberia really begins to present a connected system of mountains. The great central chain of Asia here enters on the Russian territory, and is continued under various names to Behring's Straits. At its commencement we find a circle of lofty mountains inclosing a valley of great elevation, in which the lake Baïkal extends its deep waters over a basin of rock with scarcely any sand, and from the bottom of which pillars of granite shoot up. The Baïkalian mountains, very high on the north and west sides of the lake, seem to be principally composed of granite. Among the elements of that rock the mica often presents itself in isolated laminæ, which may be used as panes of glass; and entire mountains are formed of the quartz.

A less considerable link passes to the south of the river Onon, and along the Argoon. This branch, of moderate height, but singularly rich in all sorts of minerals, is called the mountains of Nertchinsk. It is rather slaty than granitic.

[a] "Schiste corné," silicious slate.—P.

[b] "Couches puissants," powerful beds, vast masses. As *granite* is rarely, if ever, stratified, I doubt whether "couches" should be here rendered *strata*, unless it be intended for *gneiss*.—P.

[c] In Russian, *Kamen temnoseryx*. See p. 90, of this volume.

[d] In Russian, *prowalli*. See p. 155, 156, of this volume.

[e] Hermann's Mineral. Description of the Uralian mountains, vol. I. p. 41. (in German.) Pallas, Voyages en Russie, III. p. 13—15, &c. IV. 244. (trad. in 8vo.)

[f] See Book XXXVI.

[g] Pallas, Considerations on the Nature of Mountains, &c. (in German) p. 29, &c. Pallas on the Orography of Siberia, Mélanges de Géographie Physique, vol. V. 328, &c.

[h] Georgi, I. 175.

[i] "Gneiss?"—P.

[k] Renovantz, Mineral. and Geographical Description of the Altai Mountains. (in German.)

[l] "5243 Fr. feet."

[m] Georgi, I. 197.

The principal chain runs without interruption to the north-east, separating the tributary streams of the Lena from those of the Amoor. At first possessing moderate elevation, and confounded with the mountainous country surrounding the lake Baïkal, it receives the general designation of the mountains of Dauria. All this country, according to M. Partrin, is filled with volcanic traces; and on the banks of the Shilok there are two craters of extinguished volcanoes.[a] A little to the west of the sources of the Olekma, the chain takes the name of the Iablannoï mountains, or the "mountains of apples," on account of the rounded shape of the blocks composing them. The Mongols call them Daba, a name rather remarkable, as reminding us of *Tabis*, a promontory which according to Pliny and Pomponius Mela bounded Asiatic Scythia on the north-east. Acquiring increased elevation, and approaching to the Eastern Ocean, it begins at the sources of the Aldan to bear the name of the Stannovoï mountains, which afterwards gives place to the vague denomination of the mountains of Okhotsk. All these appear to consist of granite and porphyry. There are also entire mountains of red and green jasper.

A detached branch runs in a line along the Olekma river, and even passes the Lena. These mountains are of a slaty structure. Mines of alum and of coal are found in them. They form on the banks of the Lena a singular series of pyramidical rocks.

The main chain is very little known beyond Okhotsk. We are told that it suffers no interruption, and reaches Behring's Straits, though certainly much diminished in elevation. Different branches extend between the Lena, the Indighirka and the Kowyma. The space left between these branches of mountains and the Frozen Sea is small; yet they do not reach its shore, which, according to Billings, is generally lined with low hills. Another more important branch enters the peninsula of Kamtchatka, divides this peninsula longitudinally, and is continued in the form of a chain of islands, the Kuriles, to Japan.

These mountains of Kamtchatka, covered with perpetual snow, are at the same time full of volcanoes. There are three in an active state, that of Avatcha, that of Tolbatchik, and that of Kamtchatka, which is of very great height. Others are known, which have ceased to give out smoke and flame. To compensate this change, there are two others which emit exhalations accompanied with noises, inducing the apprehension that they are about to be transformed into volcanoes. The warm springs, and the abundance of sulphur, which in several places lies in the form of gravel on the shore, afford sufficient testimony to the volcanic nature of this whole chain. These volcanoes are, as has been already observed, connected with those of Japan, of Liqueyo,[b] of Formosa, and the Philippines.

Having thus described the mountains of Siberia, we must turn our attention to the vast plains called *steppes*, which occupy a large portion of that country. They differ from one another in nature and in aspect. In one place they resemble the American savannahs, consisting of wide pastures covered with abundance of tall grass; in others the soil is saline, the salt appears in the form of an efflorescence mixed with the earth, or is collected in ponds or salt lakes. In general, the steppes contain many lakes, because the waters finding no declivity remain stagnant. We have already described (Book XXV. p. 228.) a steppe between the mouths of the Don and Wolga which resembles the bed of the sea. On the east bank of the Wolga another similar plain extends, called the steppe of the Kalmuks, bounded on the south by the Caspian Sea and the lake Aral, while on the north it is separated by the Ulu-Tau mountains from the steppe of Issim. This last belongs to Siberia. It extends to the banks of the Tobol on the north-west, and to those of the Irtysh on the east. At this last extremity it joins the steppe of Baraba. This latter steppe is prolonged between the rivers Irtysh and Obi, which bound it on the west, the north, and the east. It comes in contact with the Little Altaï mountains on the south. It is about 700 miles in length, and from 160 to 190 in breadth.[c] The soil is good, and it is diversified with forests of birch. That of Issim sometimes, though rarely, presents the same aspect; and in both of them many tumuli are found, containing the remains of the chiefs of Tartar or Mongolian tribes.

Between the Obi and the Yeniseï, a mountainous country separates the river Tchoolim from the Yenisei, and forces the line of its course towards the Obi.[d] But this elevation seems to disappear in the neighbourhood of the town of Yeniseï; and, though there are some groups of hills in the south-west part of the province of Mangaseisk which send some small rivers to the Frozen Sea, these are mere islands in the vast marshy plain which extends between lower Obi and lower Yeniseï, a horrid region, where the soil is of clay almost continually in a frozen state, covered here and there with some stunted plants, and a carpeting of mosses. Yet this plain is not a continued morass. The high bluffs on the margins of the Obi show horizontal strata of argillaceous stones, which without doubt compose in a great measure the subsoil of the country.

The two islands of Nova Zembla are each divided from north to south by a prolongation of the Uralian mountains, but they consist chiefly of a marshy moss-clad plain. It has been lately found that there are saline lakes in these islands.

The country between the Yeniseï and the Lena is called a steppe by the Russians; the term is vague, and often used to conceal the ignorance of the traveller. There appear to be many flat and marshy places; but there are others which deserve to be considered as hilly countries. The Lena has a continuous elevation on its west bank. This, near the confluence of the Wilooi,[e] presents horizontal strata of a sandy and calcareous slate, and beds of clay mixed with much pyrites.[f] Another elevated country is found on the north-east of the lower Tunguska, and gives origin to the rivers Olenek, Anabara, and Khatanga, which run into the Frozen Sea. The country comprehended between the Yeniseï,

[a] Various Memoirs in the Journal de Physique.
[b] Lieou-Kieou or Loochoo.—P.
[c] "250 Fr. leagues long by 60 to 70 broad."
[d] Pallas, vol. III. p. 414—416, (French translation in 4to.)
[e] *Vilui*, Russ.—P.
[f] Pallas, t. IV. p. 131, (4to.)

the Angara, or upper Tunguska, and the lower Tunguska, presents an elevation of a remarkable description, viz. the great morass of Lis, almost equalling the Ladoga in extent, suspended as it were in the midst of hills formed of gravel.

The rivers of Siberia are among the most considerable in Asia. But they flow across desert plains, from which an eternal winter banishes the arts and social life. Their waters nowhere reflect the resplendent images of celebrated cities; their banks are nowhere adorned with magnificent harbours; nor do they ever receive vessels laden with the spoils of distant climates. A vast sheet of water, sometimes bordered by a forest, sometimes by a dismal morass; some bones of mammoths brought to view by the floods; some fishing canoes along side of countless flocks of aquatic birds; or the peaceful beaver raising his industrious dwelling without dreading the pursuit of man: this is all the variety that a Siberian river offers to the traveller. Savage hordes, and their ignorant conquerors, have given these great currents names, of the meaning of which we can only form a random guess. The Irtysh, which is really the principal river of the system to which it belongs, has been defrauded of its due rank, and made a tributary to the Obi. The Irtysh wanders a great way on the plateau of the Kalmuk country, crosses the great lake Saisan-Nor, and descends by a gorge of the little Altaï mountains. It runs 220 miles[a] before it enters the Russian territory. Navigable from the Saisan-Nor, its breadth varies from 200 to 400 yards. The Obi[b] is formed by the junction of the Khatunia and the Bi, which issues from the lake Altun or Teletskoi; but the Dshabekan, which is the only stream that enters the lake, seems entitled to be considered as the source of the Obi. This river is almost doubled by its junction with the Irtysh, which is previously augmented by the waters of the Tobol and the Issim, the first of which has a course of 330 miles,[c] and a breadth of from 60 to 200 yards. The Obi forms a wide gulf where it falls into the sea; it is navigable almost to the lake Altun:[d] it abounds with fish, but the sturgeon of the Irtysh is the most esteemed, the water of the Irtysh being the most limpid. When the Obi has been for some time frozen, its water becomes dirty and fetid, an effect owing to the sluggishness of its current, and the extensive marshes through which it flows; but in the spring season it is somewhat purified by the melting of the snow.

Next after the Obi, the Yeniseï[e] is entitled to our notice, a broader and more majestic stream, though its course is not so long. It is formed in the mountains, to the south-west of the Baïkal, by the junction of the rivers Sisket and Beikem, and then runs almost straight north into the Arctic Ocean. The upper Yeniseï might, perhaps, be considered as a tributary of the Angara, or upper Tunguska, which issuing from lake Baïkal, joins it, but surpasses it in importance and in length, and might appear entitled to give its name to the united river till it reaches the ocean. Two other conspicuous tributaries of the Yeniseï are the *Podkamenaia Tunguska, i. e.* the Tunguska beyond the mountains, and the lower Tunguska, a river larger than the Rhine; both of these fall into the Yeniseï on the east side.

The Angara is so limpid a river, that the pebbles at the bottom are seen at a depth of several fathoms. When it issues from the Baïkal, its bed, generally from two to four hundred yards in breadth, is, for the space of a mile, so confined among rocks, that the smallest boats cannot pass along safely without the strictest precaution; and its waters, dashing against the stones, make a noise like the waves of the ocean in a storm.

The Selinga runs into lake Baïkal, after receiving the Orchon and other rivers, among which is the Tula, or Tola, which is more than 300 yards in breadth, and flows gently over a plateau of rocks.

The last of the great rivers of these countries is the Lena, which rises to the west of lake Baïkal; after having received the Witim and the Olekma, which come from the Daurian mountains, it runs from south-west to north-east, till it approaches to Yakutsk, a very useful direction, as furnishing a secure navigation between very distant countries. From Yakutsk its direction is due north. It receives the Aldan on the east, and the Wilooi[f] on the west. Its bed is very broad, and contains a great number of islands. Travellers, in passing by the Lena, ascend the Aldan, descend the rivers Maïa and Yadoma, and thus complete their route to Okhotsk, on the shores of the Eastern Ocean.

Among the other rivers which mingle their waters with the Frozen Sea, we may remark the Tas, the Khatanga, and the Olenek, on the west of the Lena; the Indighirka on the east of that river; and the Kowyma, still farther to the east. These rivers have a considerable length of course, but their course and termination is very imperfectly known, from the inhospitable nature of the climate.

The northern and southern shores in the east of Siberia drawing nearer to one another, so as to terminate in a sort of angle, do not afford any remarkable river, except the Anadyr, the course of which is not very long.

Siberia is not deficient in lakes. That of Baïkal is, next to the Caspian Sea and the lake Aral, one of the largest in the old continent. It is reckoned 360 miles long, and from 30 to 50 broad.[g] Its depth varies from 20 to 80, and in some places 200 fathoms.[h] In coming to this lake from Irkutsk the view is very striking. The Russians who navigate it speak of it with a respectful awe; they give it the name of the Holy Sea, and even the surrounding mountains are held sacred.[i] The waters are fresh, and extremely transparent. It freezes about Christmas, and thaws again early in May. It is subject to extraordinary agitations, being sometimes raised into high waves by a moderate wind, and at others scarcely put in motion by a violent storm in the atmosphere. This fact, sometimes viewed with superstitious admiration, must no doubt depend on the direction and duration of the winds; that is, whether they blow over

[a] "80 Fr. leagues."

[b] *Obi*, in Russian; in the Samoiede, *Kolta;* in the Ostiak, *Iag;* in the Tartar, *Umar.*

[c] "120 Fr. leagues."

[d] Altyn.

[e] *Ienisseï*, in Russian; *Iehanneses*, in Tungoose; *Kem*, in Mongolian and Tartar; *Guk* and *Chosek*, in Ostiak.

[f] Vilui.

[g] "550 versts (130 Fr. leagues) long by 50 to 80 versts (13 to 18 Fr. leagues) broad."

[h] Russian fathoms, each 7 Fr. feet.—P.

[i] Literally, are called *Holy Mountains.*—P.

it longitudinally or transversely, and whether they come from a quarter in which the mountains offer much or little obstruction. It is said to be liable to a species of intestine commotion, or boiling, by means of which vessels receive rough shocks, even when the surface is perfectly smooth. It is rather a remarkable circumstance, that seals are found in it, although these animals are never known to ascend the Yeniseï and Angara. The lake has a particular species of fish, which the Russians call *soliomanka*, and which, according to Pallas, consists entirely of bones and an oily grease. The waves sometimes throw on shore a species of bitumen called mountain tar.[a]

The lakes of western Siberia are less remarkable for their size than for their number. Lake Techany, more than 80 miles[b] in length, and in some places 50 broad,[c] is in a part of the steppe of Baraba which is filled with lakes almost touching one another. On the map of Siberia accompanying the travels of Pallas, we count 27 lakes between Omsk, Kolywan, and Semipalatnoi, though d'Anville seems scarcely to have known of one or two. The steppe of Issim contains also a great number of lakes, among which that of Karg-Algydim is the largest. The number of small lakes in the provinces of Iset and Katharinenburg[d] is enormous. In a space 280 miles long and 80 broad,[e] from the banks of the Ouy to the sources of the Tura, along the eastern base of the Uralian mountains, nothing but lakes is to be seen. In the small map contained in the atlas of Professor Pallas, we count at least a hundred.

Salt lakes do not belong exclusively to the sandy steppes of the southern parts. They are found even in the high and cold mountains of Dauria. They are found also among the frozen morasses of the northern shores. What is more remarkable, fresh water lakes are liable to change their qualities and become salt. Of this the lake of Seidiaishévo, in the province of Iset, between the town of Tomliazk and the fortress of Zverinogolofskaia, is an example.[f] This lake was once filled with fresh water, very shallow, and full of fish. All at once its depth increased; its waters became brackish; the fish with which it abounded died; and one half of a neighbouring forest was swallowed up by it. It is only to be regretted that these phenomena were scarcely observed by any persons except a few Tartars. The learned M. Sokolof has given an interesting description of the salt lakes of the province of Iset.[g] These lakes are scattered in the midst of a great number of fresh water lakes; their saltness diminishes, for several are known in which salt formerly crystallized, but at present does not. In some of them muriate of soda alone is found, and some of them are impregnated with it to saturation; in others they find only the sulphates of magnesia and soda, (Epsom and Glauber salts,) which are never deposited in crystals, but only in round grains. Besides those already mentioned, there is, in the steppe of Issim, the salt lake Ebeloï or Bieloi, which is one of the most abundant,[h] and furnishes the Bashkeers with very good salt. It is situated near the sources of the Tobol. The Kirghisians come to bathe in this lake in summer, and believe that it cures them of many diseases. Between the Tobol and Irtysh, in the district of Issim, saline and bitter lakes are met with. In the middle of the steppe of Baraba, there is, among others, the famous lake Yamish, between seven and eight miles[i] in circumference, the salt of which is extremely white, and crystallizes in cubes; the quantity of it, however, gradually diminishes.

In eastern Siberia the salt lakes are somewhat less abundant; yet from Irkutsk to Yakutsk[k] the mountains are filled with salt springs, and these, in more places than one, form lakes. That of Selinginskoi was visited by Professor Pallas; it yields a bitter salt. The streamlets by which it is supplied are fresh, and the salt must have its origin in the blue slime at the bottom, and the subjacent rock.[l]

The soda lake of Dauria, near Zizaan, is not the only one of its kind. Others are found in different parts of Siberia.

The "Rumbling Lake" is found at a short distance from the little river of Ooibat, which falls into the Abakan. Dreadful noises are heard in it, announcing some revolutions in the bosom of the earth, like those which destroyed the dykes by which the lake of Goosinoi in Dauria was formerly confined.[m]

Siberia possesses several mineral waters, especially in the Altaïc and Daurian mountains. The chain of the Urals, near Katharinenburg, gives rise to some chalybeates. In the neighbourhood of the Sea of Baïkal there are springs of naphtha and petroleum. This country is full of hot springs, the most celebrated of which are those of Kamtchatka, described by Lesseps. The baths which have been built, by the liberality of Mr. Kochelew, for the use of the Kamtchatdales, are formed by a rapid cascade, which falls from a height of nearly 300 feet. The current which it forms is about a foot and a half deep, and six or eight broad. The water is extremely hot, and seems to contain a large quantity of sulphates and nitrates, mixed with calcareous earth. On the west of the Gulph of Penjina there is a considerable spring of warm water, which falls into the river Tavatona, and emits clouds of vapours.

Knowing the situation and nature of the territory of Siberia, we shall not be surprised to find that its physical climate does not correspond to its latitude. Three fourths of this country are in the latitude of Norway and Lapland. A part of the province of Kolywan, and the country round lake Baïkal, are in the latitude of London, Berlin, and the north of France. But the temperature of the most favoured parts of Siberia *is* not to be compared even with that of Norway. The cold in the northern part is far keener and more constant than that of Lapland, and the same intensity is sometimes experienced in the mountains on the south, in the parallels of 50° and 55°. The winter is nine or

[a] Pallas's Travels in Russia, IV. p. 103—116. V. p. 220. (French translation, 8vo.)
[b] "30 Fr. leagues."
[c] "22 Fr. leagues."
[d] Ekaterinburg.
[e] "100 Fr. leagues long, by 30 broad."
[f] Pallas, t. III. p. 32, (4to.)
[g] Idem. t. II. p. 491—502, (4to.)
[h] "Plus abondans;" properly, most strongly impregnated; yielding the greatest supply.—P.
[i] "10 versts."
[k] Gmelin, Flora Sibirica, Preface.
[l] Pallas, Voyage, tom. IV. p. 400—404.
[m] Idem. t. IV. 491—499.

ten months long almost through the whole of Siberia. Snow often begins to fall in September, and it is no rare thing to see it fall in May. The corn crops, when not ripe in August, are considered as lost. They are often covered with the snow before they can be harvested. To the east of the river Yeniseï, and the north of lake Baïkal, agriculture is almost unknown. In the vast morass through which the lower part of the Obi flows, the thaw penetrates only about a foot. Near Yakutsk, under the parallel of 60°, M. Gmelin, having caused the earth to be dug on the 28th of June, found it frozen at a depth of three or four feet. The inhabitants of the fortress of Argunsk, in the parallel of 50°, say that their lands in many places only thaw an ell and a half deep, and that the subjacent frost renders the digging of wells impracticable.[a] At Krasnoiarsk, in latitude 56°, M. Pallas has seen the mercury of the thermometer congeal and become malleable.

The summer heats of Siberia are short; but they are powerful and sudden. In the neighbourhood of Yakutsk, the Tungooses often go naked in summer. The growth of corn, and other vegetables, is almost visible to the eye. But in the neighbourhood of the Frozen Ocean it is in vain that the solar rays continue night and day to influence a soil condemned to eternal frost. In the middle of the long day of the polar circle, a north wind is sufficient to cover the waters with a thin crust of ice, and to give a yellow and red tinge to the leaves of plants.[b] The vegetation is often limited to a few days; and in that short interval the plants flower and form seed. They sometimes grow in morasses, where at all times we find ice on raising the moss.[c]

Storms are frequent in the southern parts, among the mountains; but on the banks of the Frozen Ocean thunder is scarcely ever heard, though distinct flashes of lightning are seen. In the low countries of the Yeniseï, near the sea, much of the aurora borealis is seen, from the beginning of October till Christmas. In no country do these brilliant phenomena appear in greater magnificence.[d]

The rigorous climate, while it banishes luxury and indulgence, does not secure to the Siberians the privilege of the ancient Hyperboreans, who knew nothing of disease, and died only of the exhaustion of old age. It is, on the whole, favourable to the human species, but it does not exclude every cause of disease. The continual fogs which cover the eastern and northern coasts of Siberia perpetuate the scurvy in those countries. We are told that huntsmen preserve themselves by drinking, in its warm state, the blood of the animals which they have taken. Similar fogs prevail in the steppe of Baraba, and the inhabitants have a cachectic look. In the mountains of Dauria, and in the environs of Nertchinsk, the confined air of the narrow valleys produces fevers, epilepsy, and scurvy. Some ascribe these effects in part to metallic vapours emitted by the mines, or the metallurgic operations to which the ores are subjected. In all the steppes, the cattle, and still more the horses, are liable to a species of plague called Yassooa by the Tartars and Russians, which shews itself by buboes, and by which men also are liable to be attacked. It is ascribed to an insect to which Linnæus gives the name of *Furia infernalis*.[e] In 1785 this disease carried off nearly 85,000 horses.

The chief productions of Siberia remain to be considered.—This country is called the Russian Peru. But long before the name of the Russians was known, the Permians, or Biarmians, a people of Finnish, or what the Russians call *Tchoodish* origin, had worked extensive mines in the Uralian and Altaïc mountains, of which traces are still to be seen. It is to a Dane and a Dutchman, that the Russians, under the reign of Alexis Michaïlowitch, owe the first suggestion of working the mines. Peter I. employed German miners to open the mines of Permia and Siberia. His successors opened[f] those of Kolywan and Dauria.

The principal gold mines of Siberia are those of Berezof, in the district of Katherinburg, on the east side of the Uralian mountains. It was in 1754 that they were first worked for gold, and did not rise to any importance till the reign of Katherine II. From 1754 to 1788 they yielded 1,198,000 rubles, (L.189,683,) of which, when the expense was deducted, there remained of clear profit about 800,000 rubles, (L.126,660.) The number of workmen employed in the extraction are upwards of 3000, of whom about 1200 are daily engaged.[g] The ore is an iron pyrites, mixed with quartz which contains gold. After all the refining processes, the gold is not perfectly pure. Twenty or thirty *zolonitks*, *i. e.* 3½ or 5 English pounds weight of gold are obtained from 500 poods,[h] or 1250 stone weight of the crude ore. Gold is sometimes found massive, but it is generally mixed with different substances, particularly silver. These are the only mines that are worked for gold. Those of Kolywan and of Nertchinsk are considered as silver mines; their produce in gold is trifling.[i]

Silver is rarely found in a native state, but often mixed with gold, and in one of the Daurian mountains with lead. The corneous silver ore, *Argentum muriatum*, or muriate of silver, is found in Schlangenberg, in the Little Altaï, where the sulphuret of antimony and silver, the red arsenical ore, and copper pyrites also abound. From 1745, when possession was taken of these mines by the crown, till 1787, *i. e.* during forty-two years, they produced 24,460 poods (61,150 stone weight) of pure silver, and more than 850 poods, or 2125 stone of pure gold, amounting altogether to a value of more than 30,000,000 of rubles (or L.4,750,000.) The expenses during this time, including the process of refining, which was conducted at Petersburg, did not exceed 7,000,000 rubles, or L,1,109,000, giving thus a profit of 23,000,000 of rubles, or L.3,641,000, which

[a] Gmelin's Travels in Siberia, II. 520—523, (in German.) Georgi, Description de la Russie, I. 88—92.

[b] Sujew, in Pallas's Travels, V. 113. (8vo. translation.)

[c] Compare Patrin, Ramond, and others, quoted in p. 172 of this volume.

[d] Gmelin, Flora Sibirica, Preface. Compare p. 132, 133, of this volume.

[e] Falk, Mémoires Topographiques.

[f] "Conquirent," gained possession of. The Tchudish tribes are said to have worked the former, and the Mongols the latter, before the Russians took possession of them.—P.

[g] Hermann, Statistische Schilderung, &c. p. 316—328.

[h] The pood is 40 Russian pounds, or $33\frac{37}{100}$ pounds, old French weight.

[i] In 1823, there were 11,000 gold-washers in the Uralian mountains The annual produce was 112 poods.—P.

is still more considerable when we take into account the small value of the copper money in which the expenses are paid, and which is coined in the places themselves. The silver mines of Nertchinsk, which were opened in 1704, are in Dauria, between the rivers Shilka and Argoon. Their number is great. The ore is rich in lead, and contains but little silver, yet the silver is easily extracted. The workmen are about 2000 in number, and about 13,000 peasants are attached to the concern for the cutting of timber and fuel. From 1704 to 1787, that is, for eighty-three years, these mines produced 11,644 poods of silver, (29,110 stone,) from which, after 1752, thirty-two poods of gold were separated, both amounting in value to 10,000,000 of rubles, or L.1,167,000.

Besides the copper mines in the Uralian mountains, there are some in the Altaï. Their produce is 15,000 poods; but it is nothing compared to the riches of the Uralian mines. The richest mines are on the Siberian side, at Turia-Wasiliewskoï, Frolewskoï, and Olgowskoï. They are found at the limit which separates the schistous rocks from the pure limestone. There are likewise other important workings, and the whole produce of the Ural is confounded in the statistical accounts. In 1782, 190,752 poods of copper were smelted, and of these 124,962 were in the government of Perm, and probably 150,000 in the whole from the Siberian side of the chain. The copper of Siberia is very ductile. The prevailing ores in the mines now mentioned, are the red oxide and the blue carbonate. Malachite or stalagmitic copper is found here in the greatest perfection. The iron mines which are diffused over the whole of Siberia are but little worked. The peasantry smelt iron in the neighbourhood of Krasnoiarsk and Yeniseisk; but at Nertchinsk and at Kolywan, the other more valuable metals are so productive that this is despised. In the Ural mountains, on the contrary, it is the chief object. The ores are found alike on the European and the Asiatic side. Their produce in 1782, was 3,940,490 poods (9,851,225 stone weight.) The mines of copper are said to diminish in value; those of iron are inexhaustible.

Siberia undoubtedly produces other metals; in this vast field much room is still left for mineralogical investigation. There seems to be little or no mercury. Laxmann saw crystals of cinnabar thrown on shore by the sea in the Gulph of Penjinsk. The red lead of Siberia, or chromate of lead, is found in the mines of Beresof, in a sandy and micaceous rock.

Among the precious stones of Siberia, one of the most conspicuous is the limpid and transparent topaz of the mountain of Adun-Shollon in Dauria, and of mount Totchilnaia, near Mursinsk, in the Ural. It has also been found in the Kirghisian steppe, and on the shores of the Frozen Sea. At Mursinsk, chrysolite, in small nine-sided prisms, is met with. The Siberian beryl, or the occidental *Aqua marina*, is common both in the Daurian and Altaian mountains. A prism of it was once found thirty inches long, and five in diameter, but it broke, these large prisms always having fissures.[a] The beryl and the smoky topaz are often found in the same matrix. Sometimes one of them passes through the other, a phenomenon common in many minerals, and once considered as a proof of the priority of the penetrating individual, the other being formed upon it, but now better explained by the hypothesis of a cotemporaneous formation, as the crystallizations are often found reciprocally to impress one another. Fine crystals of quartz are not rare. Those of Tiegeruk, in the Altaï, are rose-coloured. The pretended emeralds of the Ural were undoubtedly green crystals of this species. The beautiful stones called *capilli veneris*, are very limpid crystals of quartz, containing green or red capillary schorl: they are found in the Ural. It is doubted whether the opals of Siberia are of the genuine kind, but the Siberian onyxes are very fine; chalcedonians and agates are abundant. The true garnet is scarce and dear. It is polished at Katherinburg. The Siberian avanturine is a translucent reddish or grayish quartz, containing particles of mica, of a gold or silver colour. It is found in Ural, and when polished, has the appearance of mother of pearl. The rubellite, or ruby-coloured schorl, found at Sarapulka, not far from Mursinsk, is a subject of curiosity and discussion among mineralogists; and there are some contradictions in their descriptions of it. Baïkalite is amphibole crystallized in prisms. Beautiful green and blue feldspar; jasper of various colours, but in small pieces; black and white granitelle, with green veins; black porphyry, forming on the Tcharysh in the Altaïan mountains, a wall twenty feet high; very fine lazulite or lapis-lazuli in the Sludenka mountains, near the lake Baikal; the transparent mica or Muscovy glass, found on the Aldan and the Mama, tributary rivers of the Lena, in plates three or four feet square, and the working of which forms the object of several little associations among the peasants; such are the productions most deserving of mention, though much mineral treasure, no doubt, remains unknown in this vast country.[c]

We may remark, as one of the natural curiosities of this country, the mass of native iron found in 1749, between Abakansk and Karaoolnoi-Ostrog, a mass weighing 1680 pounds, and which, according to a tradition of the Tartars, had fallen from the atmosphere.[b] The asbestos of the Urals also deserves mention; of this substance napery, caps, purses, and gloves, have been woven, and some years ago, a schoolmaster offered to manufacture from it paper to an extent sufficient to supply all the offices of the Russian national records. We must not omit mentioning the soft and almost fluid clay called lithomarge, or "rock marrow," found on the eastern coasts, and which the Tungooses eat by itself or with milk, without suffering from it any inconvenience. Near the Ural mountains, powdered gypsum,[d] commonly called "*rock meal*," is sometimes mixed with bread, but its effects are pernicious. In the whole of Siberia,

[a] Pallas, Nordische beytræge.

[b] Pallas, Voyage, IV. 602. 4to.

[c] According to Kotzebue, (Voyage,) the coasts of Behring's Straits, and as far as Kamtchatka and Onalaska, are generally primitive. In Onalaska there is old red sand-stone, with porphyry and amygdaloid. At St. Peter's and Paul's (Kamt.) there are amygdaloids and basalts; at Captain's Bay, phonolite, and basalt. At St. Laurence Bay, in the country of the Tchuktchi, there is micaceous granular lime-stone in mica slate; at Kotzebue's Sound, sienitic porphyry; and on the coast N. of Onalaska, bowlders of sienitic gneiss.—P.

[d] Earthy and pulverulent gypsum.—P.

there is found on the aluminous schistus, an efflorescence called "rock butter;"[a] which is employed by the people as a remedy for diarrhœas and venereal complaints.[b]

The vegetable kingdom offers less variety. In a climate so rigorous none but the most hardy plants can thrive; the oak, the hazel, the alder, the plane, and the wild apple, cannot stand the Siberian winters; they disappear in the neighbourhood of the Uralian mountains, and on the banks of the river Tobol. The oak and hazel appear again, but feeble and languid, on the banks of the Argoon, at the extremity of Dauria; the lime and the ash cease about the Irtysh; the fir, which in Norway reaches the parallel of 70°, does not in this country pass that of 60°. The silver fir goes no farther than 58°. The common gooseberry bush which grows in Greenland, does not succeed farther north than Turukhansk on the Yeniseï. Potatoes diminish in size, till, at the latitude of 60° they are no larger than pease, and here the cabbage acquires no head. Notwithstanding these effects of the climate, we are not to conclude that the great Siberian rivers pass through mere barren wastes; for they are skirted with thick forests of birches, willows, elms, Tartarian maples, white and black poplars, and aspens, besides an immense quantity of different species of the fir tribe, among which we distinguish the Siberian cedar, or the *Pinus cembra*, which sometimes attains a height of 120 feet, and its annual rings[c] sometimes indicate an age of 150 or 200 years. It is only as far as the banks of the Yeniseï that this tree displays all its magnificence; to the east it diminishes in size, and, beyond the Lena, towards the shores of the eastern sea, becomes quite dwarfish, though still preserving its proportions. The balsam-poplar perfumes the air a great way round, and gives out by exudation its odoriferous resin. Siberia produces neither apples nor pears. The *Pyrus baccata*, or wild pear of Dauria, only yields a tasteless fruit of the size of a cherry. The fruit of the *Pyrus prunifolia*, or Siberian crab, is also small; but the berry-bearing under-shrubs, the *Rubus chamæmorus*, the *Rubus arcticus*, and the different species of *vaccinium*, abound, and agreeable drinks are made from them; the steppes are covered with a kind of cherry-tree, the *Prunus fruticosa*, the fruit of which is abundant, and is used for making a kind of wine. The *Prunus Sibirica*, or Siberian apricot, which grows only in Dauria, produces a sourish fruit; the wild cherry[d] grows in every part of Siberia, but the garden cherry becomes languid even in the neighbourhood of Issim.

During their short summer, these wild countries are adorned with a considerable number of beautiful plants; several of the Orchideæ, with their curious and brilliant flowers, are indigenous in the forests of Siberia; the *Ophrys monorchis*, the beautiful hooded Orchis,[e] the lily of the valley, black and white hellebore, the Siberian iris, the *Anemone narcissiflora*, the *thalictra*, violets, *potentillas*, the elegant *Astragalus montanus*, present, in many places, an assemblage of colours, or exhale a mixture of perfumes, for which we should search in vain in some more southern countries. Each region of Siberia possesses some flowers peculiar to itself. The *spiræa* of the Altaï differs from that of Kamtchatka. The handsome *Robinia caragana*, or Siberian pea-tree, the *Daphne altaica*, the *Sophora alopecuroides*, the dwarf almond, the *Potentilla fruticosa*, the *Asphodelus altaicus*, the *Gentiana altaica*, the *Dianthus superbus*, the *Valeriana Sibirica*, are partial to the Altaï mountains, at the feet of which the blue aster, the *rosa pimpinellifolia*, and wild tulips, variegate the hills and the meadows. It is in Dauria that the most interesting riches of the Siberian flora are united; there the rocks are richly coloured by two species of rose-bay, red by the *Rhododendron dauricum*, and of a golden yellow by the *Rhododendron chrysanthum*, along with the *Lonicera mongolica*, the *Prunus Sibirica*, and the pale stock. With this assemblage of brilliant colours are intermixed spots of dazzling white, produced by the flowers of the wild pear, the sweet briar, elder,[f] and *Spiræa chamædrifolia*. At the basis of the same mountains grow the *Anemone pulsatilla*, the white flowered *pœony*,[g] the yellow and the pink coloured *statice*,[h] the *Aster sibiricus*, and twenty species of *potentilla*, and of *centauria;* while the *Gentiana algida* displays its fine blue and white flowers at the foot of the icy alps, and the *rhodiola rosea* adorns the same morasses where the Siberian willow waves its yellow branches.[i] Eastern Siberia produces a great quantity of lilies; we may particularly remark the Kamtchatkan lily, and another called the *Lis saranne*, the roots of which are esculent. We may also mention the *Heracleum panacea*, and the *Heracleum sibiricum;* by drying the stems of these two plants, the Siberians procure a saccharine matter which is not in sufficient quantity to be of much utility. By subjecting the whole plant to distillation, they manufacture a strong liquor which is not at all agreeable, and only in request in Kamtchatka.[k]

The true rhubarb has been sought for in vain in Siberia. The *Rheum rhaponticum*[l] grows in the southern mountains to the east of the Yeniseï. There are three plants which may be used instead of tea, the *Saxifraga crassifolia*, which grows on the Bieloi mountains near the Obi; the *Rhododendron dauricum*, and the *Polypodium flagrans*, which grows on the high rocks of Dauria. The last of them is used as a cure for scurvy and gout.

Gmelin has remarked, in the preface to his Flora Sibirica, that the vegetation changes its character when we pass the Yeniseï; but it is not easy to define changes of that kind with precision. It is certain that there are many plants which do not resist the increase of cold which is felt when we pass that river; such are the *Convolvulus arvensis*, *Campanula cervicaria*, *Convallaria majalis*, *Rhamnus catharticus*, and *Dactylis glomerata*. Pallas observes that in the vicinity of the Uralian mountains we find the vegetables of Pannonia. In ascending the Irtysh towards the Altaïan mountains, we begin to observe several species which are peculiar to Siberia,

[a] A variety of alum, mixed with clay and oxyd of iron.—P.
[b] Georgi, III. 202, 297. V. 126.
[c] Circular layers of wood, formed annually, during the growth of the tree.—P.
[d] "Cerise à grappes," bird cherry, *Prunus Padus—Cerasus racemosa*, Matthioli.—P.
[e] "*Orchis à capuchon*," *Orchis cucullata?*—P.
[f] *Sambucus racemosa*, "Sureau à grappes."—P.
[g] *Pœonia albiflora.*
[h] *Statice aurea* and *rosea.*
[i] Pallas's Travels.
[k] Georgi, III. (vo.. vii.) p. 849.
[l] "Rhapontic, *Rheum undulatum.*

and their number increases when we pass the Yeniseï, but they only become abundant to the east of lake Baïkal; Dauria is their real country; these same plants do not make their appearance in the flat and wooded country between the Yeniseï and lake Baïkal. We only find here the plants which are usual in cold climates, and common even in Europe; but on the heights to the north-east of the Obi, we find several plants peculiar to the Altaïan mountains.[a]

In western Siberia on the Obi, agriculture disappears about the sixtieth parallel of latitude. In the eastern part of it, grain has not been found to ripen either at Oodskoi, which is under 55°, nor in Kamtchatka at 51°. The highest mountains of the southern frontier are too cold and too dry; thus, three fifths of Siberia are not susceptible of any sort of culture; but the south-west parts possess a remarkable fertility. To the north of Kolywan, barley gives a return of twelve, and oats of twenty fold. Buck-wheat is apt to shoot[b] in this black and light soil; but when sown in thinner soil it gives a return of from twelve to fifteen fold. The greater part of the natural order of gramineous plants which grow in Europe grow also in the south of Siberia; but only the winter rye, barley, and oats are cultivated. The Tartars, who are fond of white bread, have great difficulty in rearing a little wheat. Millet thrives in the west of Siberia. The Tartarian buck-wheat,[c] (*polygonum Tataricum*,) is sown in the steppes which have been recently cleared by means of fire. One of these fields has for three or four successive years given a return of ten or fifteen fold, without requiring to be re-sown, the grain which falls during harvest sufficing for seed for the ensuing crop; but the weeds progressively increase in number. This style of agriculture is perfectly adapted to the indolent Siberians, who thrash the corn on the harvest field, and burn the straw to save themselves the trouble of removing it.[d]

If the working of mines, internal navigation, and commercial economy, have received some slight improvements in Siberia under the last three or four reigns, it is but too evident, notwithstanding the Russian panegyrics, that agriculture is in the same state as it was fifty or sixty years ago. Bell of Antermony, more than half a century back, took notice of the abundance of buck-wheat, rice, barley and oats to the south of Tobolski, and on the south side of lake Baïkal; but the obstacles which the climate presents to the extension of agriculture have been but feebly combated. Beyond the 60th parallel of latitude, and the 112th of east longitude, (from London,) the cerealia do not succeed. In the north they are destroyed by the cold; in the east the fogs prevent them from ripening. Thus, two-thirds of Siberia are still destitute of grain. The culture of potatoes begins to supply its place.

Common flax grows in several parts of the Ural. The *Linum perenne* reaches as far as Turukhansk; hemp grows as far north as 55°. At the foot of the Altaïan mountains some Tartars make thread and cloth of two species of nettles, the *Urtica dioïca* and *cannabina*.[e] Hops are in great abundance.

The animal kingdom fills a great portion of the picture of this wild region. Among the domestic animals the rein-deer is the most conspicuous. We have seen that the cold zone being more extended in Asia than in Europe, the rein-deer come down to a lower latitude.[f] Pallas and Sokolf saw large flocks of them on the mountains bounding Chinese or Mongol Tartary, near the sources of the Onon, between 49 and 50 degrees of latitude. Thus the countries of the rein-deer and camel, which are separated by an interval of twenty or thirty degrees in the western part of our continent, touch one another, and are perhaps mingled in the countries of the east.

The rein-deer is perhaps the greatest blessing that nature has bestowed on the unfortunate nomade of the arctic regions. He yokes these animals in his sledge, drinks their milk, lives on their flesh, and clothes himself with their skins; their bladder serves him for a bottle, he makes thread of their intestines and their tendons; and he sells their horns for the purposes of pharmacy. Rein-deers are not expensive to keep, a moss which they find under the snow[g] being almost their only food. They can dispense with a house or stable in a climate in which other animals of the most robust constitution cannot live at all. But this animal does not perform so long journies as some naturalists have asserted. It is feeble, and apt to get out of breath. A team of rein-deers accomplishes only twelve or eighteen miles in a day. A Samoiede is reckoned a rich man who has 100 or 150 rein-deers. An economical Tungoose keeps as many as a thousand; a Koriak several thousands; and we are told that among the Tchooktchis there are shepherds who own as many as 50,000.[h]

The Siberian dog, resembling the wolf, is in some measure the companion of the rein-deer. He serves as an animal of draught, not only among the Kamtchatdales, but among the Tungooses, the Samoiedes, and some Ostiaks. He runs with extreme agility; but, wild and difficult to guide, he often throws himself with the sledge and his master over dangerous precipices; the equipage of the Kamtchatdales is on the whole very bad. They feed their dogs on dried fish.

It does not appear that grazing is carried to such perfection as it might attain in a country so rich in pastures. Among the Siberian nations, the Buriats and the Mongols are distinguished by their numerous flocks.

The horses of the Mongols are uncommonly beautiful; sometimes they are striped like the tiger, or spotted like the leopard. The great nomade nations of central Asia are fond of horse flesh, and prefer it to beef. They often dry it in the sun and wind, and then eat it without farther preparation. An *adon*, or stud of a noble Mongol contains three or four thousand horses or mares. The Tartars of western Siberia have taken along with them in their migration the favourite animal of their nation, the horse. He wanders in the steppe

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[a] Pallas, IV. p. 445—456. (translation in quarto.)
[b] "Monter," to run to stalk, grow too rank.
[c] Called *dikuscha* by the Tartars.
[d] Storch, Tableau de la Russie, t. I. p. 242. Compare Georgi, Russie, III (vol vii.) p. 941.
[e] Storch, Tableau de la Russie, t. I. p. 249.
[f] See p. 184, of this volume.
[g] *Lichen rangiferinus.*
[h] Storch, Tableau Statistique de la Russie, t. II. p 195.

of Baraba in immense droves. The greater part of the Siberian horses are white. The sheep are of the broad-tailed kind; but this people procure their lambs' skins which are so delicate and so well prepared, only by cruelly opening the bodies of the pregnant ewes. The black cattle of Russia transported to Siberia have diminished in size, but improved in strength. In general, the animals which belong properly to the plateau of central Asia extend more or less into the southern mountains of Siberia. The camel not only comes thither in the caravans, but he lives in Dauria with the Russian Mongols.

Next to North America and Southern Africa, this country is the most extensive hunting ground in the world. But the Russians have employed this resource with too great eagerness. The animals of chace now get beyond their reach, or diminish in number.[a]

The best sables are found at present in the neighbourhood of Yakutsk and of Nertchinsk; but they are in greater numbers in Kamtchatka. Different expedients are employed, but chiefly blunt arrows, for killing these animals without injuring the skin, which is often worth ten pounds on the spot. The skin of the *Canis lycaon*, or black fox, sells at 1000 rubles, or nearly L.160; and one of them often pays the tax due from a whole village. The *Canis lagopus*, or *Isatis*, the rock or ice fox,[b] whose colour is generally white, but sometimes bluish, inhabits the icy zone, Kamtchatka, and the eastern islands. This animal rivals the monkey in the dexterity of his mischievous pranks. The other animals that are hunted for the sake of their skins are the ermines, marmots, martins, squirrels, and others of less value. The silver-coloured squirrels of the country of the Teleoots are much esteemed. The white bear is the most formidable among the wild beasts of Siberia. The hunter nevertheless attacks him with the lance, and the stupid animal, seated on his two hind legs, allows the deadly weapon to approach. The brown bear is also common. He is destroyed by many ingenious devices. The Koriaks succeed in hanging him up on trees by a bait fixed to a strap. In the mountains they watch the path where they are accustomed to pass, and place on it a noose of a rope which has a heavy log tied to its other end. When the animal finds himself caught in this manner, he exhausts himself by dragging the weight along, or he furiously attacks the log, and throws it down a precipice, and then is dragged over along with it. The ounce makes his appearance in Dauria; the lynx and the glutton are inhabitants of every part of Siberia.

The elk is diffused over a great part of Siberia, but does not pass the latitude of 65°. It is hunted in March, when the surface of the snow begins to melt. The huntsman glides easily along with his broad wooden pattens, while the elk sinks at every step. We ought also to take notice of the *tahia*, or wild horse, in the steppes of Issim; the *koolan*, or wild ass; the *dchighetaï*, *Equus hemionus*, or wild mule, a species intermediate between the horse and the ass; the stag; the roebuck; the *antilope saiga*; the *antilope gutturosa*, or *hydrophoba* of Dauria; the argali, or *ovis musmon*, which extends from Caucasus to Kamtchatka; some wild boars on the banks of the Irtysh; the musk animal, though rare; and a great number of beavers, particularly in Kamtchatka. But as for the civet, or zibet, of which several authors speak, naturalists do not seem to know it; perhaps the animal intended is a species of musk rat, (*sorex moschatus*) which lives not in Siberia, but on the banks of the Kama, the Samara, the Wolga, and the Don.[c]

Siberia possesses also various small animals worthy of notice, such as the hare of Dauria, (*Lepus tolaï*); the hare of Mongolia, or *Lepus ogotonna*, which extends to the Aleutian islands; the mountain hare, (*Lepus alpinus*,) which makes a regular provision of hay; the mole-rat, and several other animals of the rat and mouse kind, among which we may mention the lemming, which often emigrates in colonies, always taking a straight direction, and the species called the *Mus œconomicus*, and the *Mus socialis*, which store up in their holes considerable quantities of esculent roots and bulbs, which the Siberian diligently searches out to apply them to his own use.

Both inhabitants and travellers are tormented with insects; the air is darkened with mosquitoes, and, notwithstanding the intense cold, the houses are infested with bugs. The *Blatta indica*,[d] or kakerlak, introduced from more southern parts by Kiachta, has spread to the banks of the Wolga. It has not been found possible to propagate the bee in Siberia.

This country abounds in excellent winged game, such as wild ducks, geese, swans, water-hens, woodcocks, and partridges. Among the birds of passage we distinguish the polar goose and the *Annas glacialis*. Eastern Siberia and Kamtchatka possess a species of goose, the *Annas grandis*, which lives at sea, and is sometimes thrown on shore by thousands.

It is surprising that the Russians do not attempt any whale fishing in that part of the Frozen Sea which lies east from Nova Zembla, and which is, probably, only a wide strait. Herrings and other fish, as well as the great cetaceous tribes, must abound in that sea. The Samoiedes are the only fishers in it; they catch in the Gulphs of Obi, and of Kara, particularly, the *beluga de mer*[e] or *Delphinus leucas*, which measures three fathoms in length, as well as the *Delphinus orca*. They take in large quantity the *chycale* or *Salmo nasus*, and the omoul or *Salmo autumnalis*, the last of which ascends from the Frozen Sea into all the rivers with stony beds, as the Yenisei, the Lena, and others to the east, but does not enter the Obi, which has a slimy and earthy bottom; the case is the same with the white trout.[f]

In compensation for this, the Obi produces very large sparlings, numberless swarms of sterlets, sturgeons, white salmon, pikes, eels, and eel-pouts; besides many of which we only know the Russian and Ostiak names, and which require from the naturalist long dis-

[a] Prodromus faunæ rossicæ, by M. Dwigubski, M.D. of the University of Moscow, Gottingen, 1804.
[b] Gmelin, Nov. Comment. Petrop. V. 358.
[c] Storch, t. II. p. 34.
[d] *Blatta Orientalis.* Linn.—P.
[e] *Sea-beluga* or white fish, in distinction from the *beluga* of the Caspian, a species of sturgeon (*Accipenser Huso.*)—P.
[f] Pallas, Voyage, t. IV. p. 105. 4to.

cussions. Many of these fish ascend from the sea; others come down from the lakes and smaller streams; they are almost all obliged to quit the Obi on the approach of winter, before its waters become corrupted under the ice. This putrefaction arises solely from the marshy quality of the soil, and the slowness of its course; some also ascribe it in part to the saline particles brought down by the Irtysh and the Issim; this is not so well substantiated. The waters of the river continue uncorrupted near the mouths of such of its branches, as flow through a rocky soil, and many fishes remain only in these places. The putrid waters disappear in the spring, when the melting of the snow supplies the river with fresher and better water. The waters of the Irtysh being somewhat calcareous, furnish excellent sturgeons. The sterlets and eel-pouts of that river are very large. The Yeniseï, the Lena, and the other rivers of eastern Siberia, abound in salmon, omouls, and trout.

The fisheries of the coast, and among the islands of the Eastern Ocean, are very rich, and very remarkable even considereed as an article of physical geography. The sea between Mantchooria, Siberia, Kamtchatka, and the Kurile islands, is a real Mediterranean. The sea lying between Asia, America, and the Aleutian islands, partakes very much of the same character. In these two ichthyological regions are seen numberless shoals of those singular animals which hold an intermediate place between quadrupeds and fishes, such as whales, sea-bears, sea-wolves, manatis, and sea-otters. Our account of these is reserved for the description of Russian America.

Such is the picture which the physical geography of Siberia at the present time presents; but it must have been different at an epoch when large herbivorous animals, similar to those of the torrid zone, occupied rich pastures, which must then have supported them in this country, and which presuppose a very mild temperature. We have already called the attention of our readers to the numerous remains of elephants and rhinoceroses, and other animals of the torrid zone, which have been found in Siberia along the Issim, the Irtysh, the Obi, and the Yeniseï, and on the very shores of the Frozen Sea.[a] The bones of these quadrupeds are found mixed with sea-shells and other bones which appear to be skulls of the largest inhabitants of the ocean;[b] they are met with along the river sides, in beds of earth, and seldom, if ever, in a stony soil. The Liaikhof islands are composed entirely of gravel, ice, and the bones of elephants, rhinoceroses, buffaloes, and cetaceous animals. They have even found rhinoceroses and mammoths, or Siberian elephants, quite entire, with part of the skin in a good state of preservation.[c]

These astonishing remains of an animal population foreign to the present climate of Siberia have given rise to various conjectures. It is unnecessary to refute the learned Bayer, who wished to consider them as belonging to elephants which accompanied the Mongolian and Tartar armies. The immense number of bones found is adverse to such a theory, although no admixture of the remains of marine animals had been present. Pallas thinks that they may have been carried to their present situation by a deluge; but they present no trace of having been rolled or dragged along for any length of way. These circumstances concur to make us consider them as the remains of animals which had lived in the very places in which they are found. But how could these animals have subsisted in a country so barren and so cold? For the solution of this problem, it has been supposed that Siberia must have been at one time much more temperate and fertile than now. Was this owing to a different position of the ecliptic, producing a different state of the terrestrial zones? Geometricians and astronomers are not inclined to admit the possibility of any such alteration in the astronomical position of the globe. There is another fact which is worthy of mention, that, though we should not expect in Siberia the wonderful activity of the madrepores which in the equatorial seas rear new islands, yet the lake of Kamyshlowa, on the right bank of the Irtysh, not far from Petropaulofsk, is encircled with successive banks of coral, and, according to some authors,[d] it would appear that the madrepores even still continue to form new banks. A more full investigation of this fact might throw a great light on the physical history of the globe. Perhaps, as these madrepores retain their activity in cold seas, or may belong to species differently constituted in their relations to temperature; so the large quadrupeds may, in like manner, have been different species which were adapted to a Siberian climate, and lived on a vegetation which, though not vigorous, was extended over a wide territory. With regard to the accident which may be supposed to have brought so many to deposit their bones in the same heap, it is a difficult problem, but as a point of conjectural physical history, it is not limited to Siberia.

[a] See p. 101–103, of this volume.

[b] Acta Petropolitana, 1773. t. XVII. p. 582. Compare Pallas, Voyage, t II. p. 10, 377, 403. t. III. p. 84, 106. t. IV. p. 50, 379, 459.

[c] Ibid. IV. p. 130. Adams' Journey to the Frozen Sea, in the Ephemerides Geogr. of Weimar, XXV. p. 259, &c.

[d] Georgi, III. 1041.

BOOK XXXVIII.

SIBERIA.

Its Nations, Provinces, and Towns.

When we mean to give a description of an extensive country in detail, it presents itself in two different points of view, which have two corresponding modes of subdivision. It may be divided into governments, provinces, and districts. It may also be divided according to the nations which inhabit it. The one of these methods is that of chorography; the other, that of ethnography. We usually begin with the first. In the present instance we shall begin with the last, as an order fitted to impart both greater clearness and greater interest to our descriptions.

The Russians, Cossacks, and other colonists from Europe, inhabit chiefly the towns and military stations of Siberia. Some of them are descended from the soldiers employed in the conquest of the country; others are criminals sent thither in banishment. To these two classes are to be added adventurers, deserters among the peasantry, and ruined merchants who have sought here the means of repairing their fortunes. These different classes of colonists, burying themselves in a vast desert, have joined to their original grossness that which is generated by a savage climate. But, if ignorance, indolence, and drunkenness, often encroach on their happiness, we find them praised by travellers for their generous hospitality, their frank gaiety, and the good order which prevails among them. Only a century ago, the Siberians were considered as so savage a race, that Peter the Great conceived that he could not inflict a severer punishment on his mortal enemies the Swedes than to send them to Siberia. The consequence was, that these honourable exiles introduced into that country the customs and the manufactures of Europe. While employed in ameliorating their own situation, they civilized the people among whom they came. The Swedes founded, in 1713, the first school at Tobolsk; there they taught German, Latin, French, geography, geometry, and drawing. In 1801, Mr. Kotzebue found in that place people who studied the Russian, French, and German literature, and saw his own plays acted on a public theatre.[a] These were symptoms of the extended progress of the Siberians in the cultivation of the mind. At the same time, the governors, and the civil and military officers, have introduced into the Siberian towns the manners of Petersburg, with the Russian vanity and ostentation. Mr. Lesseps saw elegant carriages rolling along the streets of Irkutsk. But this refinement of the manners of the Siberians has not had an opportunity of extending to the small towns and the villages which are sadly scattered in the midst of vast forests. Some farmers, rich in flocks, scarcely know the use of money, and lead a life altogether patriarchal. The hunters, ranging the deserts, are transformed into a sort of savages. The frozen ground serves them for a bed; they quench their thirst with the berries of the thickets; they even drink the blood of the animals immediately after they are shot. The Cossack who, at Tobolsk or Irkutsk, finds himself confounded with the populace, becomes a sort of monarch when sent among the Samoiedes or the Yookaghirs to collect the taxes, and to maintain order. He has a cottage for his palace, and a corporal's staff for a sceptre; the delicacies of his table consist in salmon, the flesh of the rein-deer, and the heads of bears. Some Cossack families established in the towns have obtained the rank of *dvoriainin*, or patrician nobles.[b]—The merchants of Siberia are chiefly itinerant, going from town to town, and from market to market.—The number of Europeans established in this country, and of Siberiaks, or descendants of Europeans, amounts at present to half a million.

Numerous Tartar hordes[c] occupy the south part of the government of Tobolsk. Those removed farthest to the east are the Biriusses, the Katchinzi or Katchinians, and the Beltires. These three tribes, more or less mixed with Mongolian blood, live in the neighbourhood of the Abakan, a river which falls into the upper Yenisei. The Katchinians are rich in cattle. Their beardless visage indicates a mixture of Mongolian blood. They have among them some dexterous magicians, whose dress resembles that of the French.[d] In the south the Sayanians occupy the mountains of that name. These nomades have some features of resemblance to the Mantchoos.[e] A tribe of Teleoots, or Telengoots, live in the neighbourhood of Kutznesk; the greater part of them live in the Kalmuk country. The Russians call them white Kalmuks. Some of them who have been obliged to submit to baptism still neglect the greater part of the ceremonies of the Greek church. Their language is half Mongolian.[f] In going down the rivers Tomsk and Tchulum, we find two Tartar hordes called after the names of these rivers. They were converted to Christianity by the Archbishop Philophei, who forcibly baptized them; but their religion is now a strange mixture of Christianity and Paganism. The Tchulym Tartars speak a dialect consisting of Tartar, Buriat-Mongolian, and some Yakoot words.[g] Among various insignificant tribes, we may mention the Abinzi who call themselves in the singular

[a] Kotzebue's Account of the most remarkable year of his Life.
[b] Georgi, Russie, II. (vol. 4to.) 1009.
[c] "Peuplades." I have changed this from *colonies*, in the English translation, to hordes. It rather signifies small nations, like those of savages, such as the tribes of N. American Indians, the smaller divisions of which are also called tribes.—P.
[d] Pallas, Voyage en Russie, IV. 580. 4to.
[e] Gmelin's Travels, IV. 370. 8vo. (in German.)
[f] Georgi, Description of the Russian nations, II. 240, (in German.) Vocab. Petropolit. No. 101.
[g] Vocab. Petrop. No. 96.

number *Aba*, and in the plural *Abalar*. They live among the Telengoots. In passing the Obi we find the Barabinians, (Barabintzi,) who live by fishing, and their cattle, in the great steppe known by that name. Some of them are Mahometans, and the rest pagans. The Tartars of the Obi live along the left bank of that river, as far as the environs of Narym. Those of Tobolsk live on the two banks of the river of that name, from the frontier all the way to its mouth. The Taralians, in the district of Tara, speak the same dialect as the preceding. The Turalinzi or Turalinians, the most civilized of all the Tartars of Siberia, inhabit the towns and villages situated on the banks of the Tura, from the mountains till it reaches the Tobol. They were forcibly baptised in the river by the archbishop Philophei, assisted by a body of Cossacks.

The constitutions of the Tartars are generally robust and vigorous. Their simple mode of life, their frugality, and their cleanliness, protect them from the greater part of contagious and malignant diseases, excepting the small-pox, which has at different times spread terrible ravages among them. The cleanliness and temperance of this people chiefly depend on their religion. The Koran enjoins them to wash themselves several times a-day.[a] By forbidding the use of spirituous and vinous liquors, it secures them from the consequences of Russian drunkenness. The commandment which prescribes abstinence is less favourable to health. The Tartars observe 205 fasting days in the year. The whole number of Tartar tribes may amount to a population of 100,000.[b]

We now proceed to mention such Mongolian tribes as have fallen under the Russian sway. The true Mongols live about Kiachta and Selinginsk, and are in small number. The Buriats, or Barga-Buratt, a great Mongolian race, have peopled almost the whole province of Irkutsk, and that of Nerchintsk; they are computed at 98,000 souls.[c] In their exterior the Buriats resemble the Kalmuks. There is a greater proportion of fat people among them; they have still less hair, and many of them have no beard whatever. Their complexion is pale and yellow. They are deficient in corporal strength; a Russian of the same age and size with a Buriat is a match for several of them in wrestling. The Buriats, however, enjoy good health, though they seldom reach an advanced age. The small-pox, once destructive to this tribe, has ceased its ravages, since the establishment of an institution for inoculation at Irkutsk. The itch is very prevalent among them, and promoted by their manner of living and clothing. To the east of lake Baikal they make use of warm baths in chronic diseases. Their physicians are *shamans* or sorcerers, who attempt to cure them by sacrifices and talismans rather than by natural remedies. The Buriats speak a very rude dialect of Mongolic, rendered unintelligible by frequent transpositions and changes of consonants.[d]

The third race of indigenous inhabitants of northern Asia is that of the Tungooses, who call themselves Œvœn. The Chinese call them Solon,[e] and the Yookaghirs, Erpeghi. They have a common origin with the Mantchoos. The Tungooses are distinguished by their regular conformation. They are usually of a middling size, limber, and well made. Their countenance is less flattened than that of the Kalmuks, with small and lively eyes, the nose well proportioned, the beard thin, the hair black, and the expression agreeable The Tungooses are subject to few diseases; yet they seldom attain old age, which proceeds from their climate, and their laborious and dangerous mode of life. Sometimes the small-pox makes terrible ravages among them. The priests of their idolatry are their physicians. Among the Tungooses the senses of sight and hearing are incredibly acute; the organs of taste, smell, and touch, are less sensible. These nomades are well acquainted with every tree and every rock within their district. They can point out with certainty a road of a hundred miles, by describing the stones and trees which occur in it; and thus can give sure directions to travellers. They follow the game by the slight marks which their steps leave on the grass or on the moss. They have never submitted to the rite of baptism. Their religion is a branch of Shamanism. Their supreme divinity is called Boa. Polygamy is allowed among them. Their princes are called Tai-Sha, a term which appears to be Mongolic. The language of the Tungooses is a dialect of Mantchoo, with a mixture of Mongolic words, chiefly consisting of such as denote objects relating to civilized habits.[f] The Tungoos language comprehends eight or ten dialects.

This tribe pitches its moveable dwellings over a third part of Siberia. It extends from the banks of the Yenisei to the sea of Okhotsk. On the south side it occupies the east part of Dauria. These Tungooses are good horsemen, excellent archers, brave and robust. Another tract of country inhabited by the Tungooses extends between the Lena and the Yenisei, as far as the lower Tunguska. Like their neighbours the Samoiedes, they are poor. Those on the Lena, called Olenians, live by the rein-deer, and the produce of fishing and hunting. Their name is from Olena, the Russian word for the rein-deer. Lastly, the Lamuts, or shoremen, from *Lama*, the sea, in the Tungoos language, occupy the province of Okhotsk, as far as the limits of the Koriaks. Their entire number amounts only to 24,000 persons.[g]

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[a] "Il donne même des préceptes que les femmes sont obligées de suivre dans les accidens propres à leur sexe."

[b] The following tribes, along the Russian and Chinese frontier, were visited and explored by Pestaref, between 1772 and 1781, viz. near Oredinsk, the Silpigorsk, Oudinsk, Karagansk, and Kamgatsk Tatars. The last tribe are of Turkish origin, and live by hunting. The Buriats, (Russ. *Pod-Ostrijintsi*,) are divided into five tribes; they are agricultural and nomadic, and of Kalmuck origin. The Kamashes, on the Rybus and lake Kan, are herdsmen, and hunters in the steppes; they have been much reduced by the plague. The Kanski are divided into the upper and lower; the former nomadic, the latter agricultural like the Russians. The Kandyns, on the Kesir, are stationary, but much reduced by the small-pox. The Motoses, near Skedatsk, are nomadic. The Sovets, (Soiootes,) are also nomadic; those of the Topi tribe are coarse and filthy; those who trade at Kiachta are rich, the rest miserable. They have frequently suffered extremely from famine. In 1780, the Chinese government removed them to the Lake Tachi-nor, where it settled them with supplies. The Soyets of the tribe Olet, on the river Alachou, are rich in cattle, and some of them in silver.—P.

[c] Heym, Encyclopédie Russe, p. 219, (edition of 1783-4.)

[d] Fischer's History of Siberia, I. p. 33. Gmelin's Travels, III. p 370. Georgi's Description of the Russian nations, IV. p. 420. (all in German.)

[e] Fischer's History of Siberia, I. 465, note 16. Pallas, Mémoires Histor. sur les Mongols, I. p. 2, (in German.)

[f] Vocab. Petropol. No. 138—145. Georgi's Travels in Siberia, &c I. 268—271, (in German.) Billing's Travels, edited by Saur, p. 387 (in German.) Fischer, Histoire de Siberie, introd. p. 116.

[g] Heym, loc. sit.

At the base of the northern Uralian mountains and on the lower Obi, we find some tribes of Finnish extraction,[a] and perhaps originally from Europe, for we have no proof that the Finnish nation was originally Asiatic.

The Wogools,[b] who live between the Tobol, Berezof, the Obi, and the Uralian mountains, are under the middling stature. They have generally black hair and little beard. Their principal business is the chace, in which they display singular agility and address, and manage equally the musket and the javelin. They also excel in laying all sorts of toils for deer. They call themselves *Mansi;* their language is very mixed.[c]

The Ostiaks of the Obi, who are likewise of Finnish extraction, form one of the most numerous tribes of Siberia, reckoning about 30,000 males. The name of Ostiak, which signifies stranger, has been given by the Tartars to three different tribes. The Ostiaks of the Obi, named Mansi by the Wogools, assert that they are descended from the Permians. Before submitting to Russia, they were governed by princes of their own nation; and from their descendants the chiefs of the tribes are still taken. This people has no alphabet. They can count no higher than ten, which is also the case with the other Finnish tribes. They possess the country from Surgut to Berezof and Obdorskoi.

The Ostiaks, says a Russian traveller, Souyef,[d] are small and feeble. Their physiognomy has no distinguishing characteristic. Their hair is generally of a reddish or a light yellow cast. They wear a tight dress, which is made of skins and furs. The men make a mark upon their skin, the women sew figures on the back of the hand, the fore arm, and the fore part of the leg. Their summer cabins are of a pyramidal form; the winter ones are square, and built of wood.[e] The Ostiaks are properly fishermen, but in winter they make great hunting expeditions. The rich possess flocks of rein-deer. Nothing is so dirty and disgusting as their appearance and manner of living; yet they enjoy good health. They generally die of scorbutic, nervous, and other chronic diseases. The Ostiaks are still pagans. In swearing allegiance to a new emperor, they are made to go on their knees before a bear's skin, or an axe with which a bear has been killed; each Ostiak is presented with a piece of bread on the point of a knife, and takes his oath in the following terms: "If in the course of my life I become unfaithful to my Czar, if I do not pay my tribute, if I desert my canton, &c. &c. may a bear devour me! may the morsel of bread which I now eat suffocate me, this axe cut off my head, and this knife pierce my heart!" This is a ceremony used among all the idolatrous people of Siberia. The bear enjoys among them a religious veneration. They make sacrifices before going out to hunt this animal; and after having killed one, they celebrate his memory by an expiatory fete, and by songs addressed to his manes.[f]

It is thought that the whole Samoiede race has moved down the course of the Yeniseï; for there are still found from the upper Yeniseï and the Abakan to the west end of lake Baïkal some weak tribes which speak dialects that have a great mixture of Samoiede words, or which even belong entirely to that language. Such are the Soyets, who are said to be numerous in Chinese Mongolia; the Kaibales, who leave the dead bodies of their children exposed on the trees, and who dispute with the mountain hare the heaps of hay provided by that intelligent animal; the Matores, the Karagasses, the Kamachinzes, and lastly, the Ostiaks of Narym.[g] It might appear natural to consider the Ostiaks of the Yeniseï or of Pumpokol as a link of that chain; but it appears that this tribe of hunters has formed for itself a peculiar jargon, which defies the researches of historians.[h]

The Samoiedes properly so called occupy an immense extent of territory, covered with heath and morass. They are bounded in Europe by the river Mesen, about 42° of east longitude; and in Asia they go as far as the Olenek near the Lena, and almost under the 117th meridian. It is a space of 2070 miles[i] in length, and from 270 to 550[k] in breadth.

The ordinary stature of the Samoiedes is from four to five feet; they are generally squat, with very short legs, a large and flat head, a flat nose, the lower part of the face very projecting, a wide mouth, large ears, and a very scanty beard; their eyes are small, black, and narrow;[l] to these attractions they add an olive coloured skin shining with grease, hair black and bristly, which, though small in quantity, they arrange with great care. The women have an easy shape and mild features. They arrive very early at the age of puberty. The greater part of the girls are marriageable at eleven or twelve, but they have few children, and they cease bearing before thirty. These people, who may be called the Hottentots of the north, only use their tame rein-deers for drawing their sledges; they use the wild rein-deer for food. Equally dirty as the Ostiaks, they are richer and better clothed. Their only worship is a gross form of fetichism; a stone or a piece of wood is the object of their adoration, or rather of their superstitious attention. They carefully avoid pronouncing the names of the dead.[m] Their magicians are adroit jugglers, who will plunge a knife into their bodies without being wounded. Acting the part of inspired persons, many of them become really phrenitic. Some of these sorcerers, at the least touch or look, are seized with a kind of madness, roll upon the ground, utter loud howlings, and even attempt to kill those around them with any weapon they can find. The Russians, who are accustomed to the sight of savages, tell us that these magicians inspire them with a sort of terror. The women are extremely unhappy and despised; considered as impure beings, they are obliged to perfume them-

[a] Adelung, from a comparison of languages, thinks that the term Finnish is improperly applied to this group of small nations, (Permians and Sirjanians, Chermisses, Mordvins, Votiaks, Voguls, Chuwashes, and Ostiaks of the Obi,) adjoining the Uralian mountains, both on the E. and W. He thinks they belong to a peculiar race.—P.

[b] Voguls.

[c] Georgi, Description des Nations Russes, I. 65. Compare with Adelung's Mithridates, I. p. 539.

[d] Voyage de Pallas, t. IV. p. 51—88, (4to.)

[e] "En charpente," framed.

[f] Georgi, Descr. des Nat. Russes, I. 21.

[g] Fischer, Histoire de la Siberie, I. 137, 168, 170, &c.

[h] Adelung, Mithrid. I. 580.

[i] "750 Fr. leagues."

[k] "100 to 200 Fr. leagues."

[l] Storch, Tableau de la Russie, p. 405. Souyef, Voyage de Pallas, IV. p. 190, (in 4to.)

[m] Wasili Krestinin, Observations on the Samoiedes, in Busse's Journal of Russia, I. p. 291, &c. 371, &c. II. 83, &c. 245. &c. (in German.)

selves before passing the threshold of the cabin. The amusements of this wandering people consist in dances, in which they keep time to a nasal sort of song. Divided into different tribes, among which the Obdorians and the Iooraks are the most remarkable, the Samoiedes do not amount altogether to 20,000 persons; but placed out of the track of conquerors, they have preserved their language, which resembles no other, in an unmixed state.[a] They give themselves the name of *Ninetz*, which signifies men in general; or that of *Chosovo*, which signifies man, in distinction from the other sex.

The Yakuts, who live to the east of the Samoiedes, in the neighbourhood of the town of Yakutsk, and on the banks of the Lena all the way to the Frozen Sea, appear to be degenerated Tartars, who have withdrawn themselves from the power of the Mongols by emigrating to these distant regions. They call themselves *Socha*, in the plural *Sochalar;* there is still among the Tartars of Krasnoiark a branch which bears this name. The Yakuts, contrary to the custom of their neighbours, wear long hair, and short and open dresses. In dirtiness they yield to none; for a grave author assures us that the mortars which they use for bruising their dried fish are made of cow dung hardened by the frost. Their number in all amounts to 84,000 persons.

The Yookaghirs inhabit the mountains in which the Indigirka and the Kowyma take their rise. They consist of 500 families, all baptized, who live by the chace and the produce of their rein-deer. We do not well know whether they should be numbered among the Samoiedes or among the Yakuts, or be conjoined with the tribes which are next to be enumerated.[b]

The Tchooktches[c] possess the very eastern extremity of Asia, on the east side of the Yookaghirs, and on the north of the Koriaks. They consist of a thousand families at the utmost, who are generally found in small camps near the rivers. Their tents, of a square figure, consist of four poles supporting a roof of rein-deer skins. In front of each tent, lances and arrows, fixed in the snow, are at hand to repel the sudden attacks of the Koriaks, who, though belonging to the same race, often annoy them with perfidious warfare. In the middle is a stove; and their bed consists of small branches of trees laid on the snow and covered with wild beasts' skins. Their dwellings are dirty, and their food disgusting. The dress of the women consists of a deer's skin hung from the neck, so that by untying a single knot they are completely naked. The Tchooktches have large features, but they have not the flat nose nor the small sunken eyes of the Kamtchadales. Lesseps says that their figure has nothing of the Asiatic form, and Captain Cook had previously made the same observation. The Tchooktches are able slingers, and display much courage and address in whale fishing, which they conduct in the European manner, without having received instructions from that quarter.

The Shelagi, near the cape which bears their name; the Ashushalat, and the Peyeskoli, on islands of the Frozen Sea which are little known, belong to the family of the Tchooktches.[d]

The Koriaks, whose number does not amout to 2000, live by their rein-deers or by hunting, near the rivers of Anadyr and Olutora. The Olutorzi (the Lutores of Witsen,) speak a smooth language, but in general the idiom of the Koriaks approaches both to that of the Tchooktches and to that of the following tribe.[e]

The Kamtchadales, whose number diminishes so fast that in a little time the whole tribe will probably be extinct,[f g] are a people of short stature, with firm shoulders, a large head, a long and flat countenance, small eyes, thin lips, and little hair. The Kamtchadale women have fine skins, very small hands and feet, and a tolerably well proportioned shape. This people are subject to few diseases; many lame persons are to be seen among them, a circumstance probably owing to their labours and perilous undertakings. Their most common complaints are scurvy, and diseases resulting from immorality; the latter were known before the Russians came among them; they have no physicians. The glare of the snow subjects them to frequent inflammations of the eyes. The small-pox, like the plague, carries off entire generations; yet inoculation has been long used among them; they perform the operation on themselves with a fish-bone. Their sexual temperament is keen, which is ascribed to their fish-diet; and their tendency to libertinism is not repressed by the severity of the climate. The Kamtchadales of the south have their *isbas*, or *balagans*, that is to say, their winter and summer cabins, raised on stages twelve or thirteen feet high, for the purpose of drying their fish, which is almost their whole support. They wear next their bodies a cotton shirt, with wide pantaloons of deer-skin; their boots are of tanned leather, and their caps of fur. The chief occupation of the men is fishing. In summer the women go into the woods to gather vegetables, and during this occupation they give way to a libertine phrenzy like that of the ancient Bacchantes. They travel on a light carriage, on which they sit side-ways, and instead of the rein-deer, they are drawn by dogs of a breed very similar to our shepherd's dog. In the north of Kamtchatka, the cabins are subterranean excavations, which retain the heat with advantage; but the confinement and exhalations generate an atmosphere which is insupportable.

We now proceed to give an account of the provinces and towns of Siberia.

The province of Ekaterinburg belongs to the government of Perm, the greater part of which is situated in Europe. It occupies the eastern declivities of the Uralian mountains. Ekaterinburg consists of 2000 houses, and is the seat of general administration for the mines. Irbit is famous for a great fair for conducting the commercial intercourse between Europe and Siberia.

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[a] Vocabul. Petropol. Nos. 120—129.

[b] Georgi, Desc. des Nat. Russes, III. 328. Sauer, Voyage de Billings, 387, &c.

[c] Tchuktchi.

[d] The sedentary Tchuktchi, who inhabit the peninsula of *Tschukstskoi Noss*, and the coast S. to the river Anadyr, speak a language which has a close affinity with that of the Esquimaux. They are the only people in Asia, whose language is connected with any American language. The Rein-deer Tchutktchi speak a language closely related to the Koriak. (*Duponceau.*)—P.

[e] Steller's Description of Kamtchatka, 59—71, (in German.)

[f] Krusenstern's Voyage round the World, II. 270, (original German edition.)

[g] According to Cochrane, the Kamtchadales are now reduced to 500 souls, chiefly in the N. The whole population of the peninsula is stated by him at 4574, Russians, Kamtchadales, and Koriaks.—P.

The district of Troïtsk, containing a town of the same name, belongs to the government of Orenburg. The town is a rendezvous for Kirghisian caravans.

The GOVERNMENT OF TOBOLSK extends along the banks of the Obi, the Irtysh, and the Tobol. We begin with the district of Tobolsk, situated at the junction of these three rivers, in the midst of an immense plain, interrupted only by moderate elevations, (*falaises.*) The climate is on the whole severe, yet the summer heats are considerable. It is not an uncommon thing to see the thermometer rise to 90° or 95°. Storms are frequent in this quarter; and the rains are very heavy. The cold is as severe in winter as the heats are powerful in summer, the thermometer often falling to 30°[a] below zero; yet the climate is very healthy. Venereal complaints and intermittent fevers are the only two prevailing diseases. There is no such thing as a fruit tree. The government garden, certainly the finest in the country, exhibits them only in paintings on the walls. The pea-tree of Siberia, or *Robinia caragana*, the birch, and above all, the black alder, *Rhamnus frangula*, are the favourite trees of the inhabitants of Tobolsk. There are some red currants and green gooseberries. Every kind of grain succeeds; the grass is thick and juicy; the soil, every where black and light, stands in no need of manure. The peasantry, too idle to remove the dung of their stables and cow-houses from time to time, are sometimes obliged to pull them down and build others, on account of the inconvenience attending the enormous accumulation.

Tobolsk, situated on the left bank of the Irtysh, and opposite to the confluence of the Tobol with that river, is considered as the capital of all Siberia.[b] It is the place of residence of a governor and an archbishop. The upper town is 223 feet[c] higher than the lower, and they communicate by an ascent of 290 steps. The numerous domes and steeples of this place give it a magnificent appearance at a favourable distance. The governor's palace in the citadel is an agreeable resting point to the eye, but having been burnt, it only shows well at a distance. The streets are laid with timber, and cross each other at right angles; the houses are generally of wood, but handsome; the population, increased by a flourishing trade, amounts to 16,000 or 17,000 souls. The inundations of the Irtysh and Tobol sometimes lay the country under water for twenty-six miles[d] round the city. On such occasions it can only be entered by water, and the streets are covered with boats and rafts by which business is transacted. "Tobolsk," says Kotzebue, "is surrounded with rocks, which have been marked in a picturesque manner by the torrents. From these we may see, during the rains, the immense surface of water which inundates the neighbourhood, to the borders of the thick forests which on all sides appear in the horizon. There the eye of the exile is fixed on each sail which appears, where, in imagination, he figures his family coming to participate in his misfortune."[e]

Sibir was the capital of the Tartars while they ruled Siberia; that city was situated about ten or eleven miles[f] from Tobolsk, on the little river Sibirka. It is with difficulty that some obscure ruins of it can now be found.

At Demianskoi-Yam, a travelling stage on the Irtysh, north from Tobolsk, cabbage ceases to form a head, producing only some scattered leaves. At Samarofskoi-Yam, a little above the confluence of the Irtysh and the Obi, the rigour of the climate becomes too severe for horses to endure. We then enter on the vast district of Berezof, which extends to the Gulphs of Kara, of Obi, and of Taz, a space two or three times larger than Finland or Norway, and situated under the same latitudes, but two or three hundred times less populous. The summer heats at Berezof, in the parallel of 64°, are of short duration but powerful, and are suddenly followed by the cold weather. The frosts generally begin at the end of August, and the ice of the Obi never breaks up till the end of May. There is no agriculture, yet some garden vegetables (*légumes*) are cultivated. The forests are composed of birches, firs, and Siberian cedars, all stunted. Aquatic birds and fish are abundant.

The country at the mouth of the Obi, called Obdoria, is still more wretched. The ground scarcely thaws to a depth of eighteen inches, even during the long day of summer. Nothing is to be seen but morasses overgrown with all kinds of rushes, mixed with small bushes of the creeping willow,[g] the dwarf large-leaved birch, the marsh cistus, the *Andromeda*, and the *Arbutus alpina*.[h] On the Uralian mountains, where the elevation is not great, larches six feet high, and alders and willows in the state of underwood, sometimes form very close thickets. On the borders of the ocean two species of bramble are almost the only plants to be found.

The district of Surgut, to the south-east of Berezof, and north from Tobolsk, contains elevated lands, covered with marshy forests, where sables, foxes, and martens, formerly abounded. Surgut is a small town on the Obi.

The district of Turinsk, situated to the west of Tobolsk, contains arable lands. Provisions there are very cheap. The chief place, Turinsk on the river Tura, is a considerable town for that country.

It was at Pelym, north from the preceding, that the celebrated Field Marshal Munnich passed twenty years of his life, previously so active, and so useful to barbarous and ungrateful Russia. "The woéwodat of Pelym," says Munnich himself, "is covered with marshy forests, which cannot be traversed in summer with any sort of carriage. In winter, people pass along by means of pattens five feet long, six or seven inches wide under the feet, and covered with rein-deer skins to prevent them from sliding. The inhabitants guide themselves across these forests by means of the compass, which they can make for themselves, the magnet being pretty well known among them."[i]

The district of Tioomen, to the south-west of Tobolsk, is more open and less covered with forests than

[a] "40°Reaumur."—58° Fahr.—P.
[b] See Hermann's Memoirs of Physics, Economy, and Statistics, (in German) I. p. 23—100, for a description of the government of Tobolsk.
[c] "35 toises."
[d] "40 versts."
[e] Tobolsk, from recent accounts, contains 19,917 inhabitants, and 1978 houses, of which only 18 are of stone.—P.
[f] "16 versts."
[g] *Salix repens.*
[h] Souyef, in Pallas's Travels, t. IV. p. 29.
[i] Busching, t. II. part I. p. 491. French translation.

Turinsk; it exports grain, and even some apple-trees are found there. Tioomen, a flourishing town on the Tura, has many Tartar inhabitants, and handsome carpets are manufactured in it.[a] At some distance from it is found the tomb of the traveller Steller, who has made us acquainted with Kamtchatka.[b]

The district of Yalutorowsk is east of the preceding. No where are richer meadows to be seen than here; they are cut down by the first who comes; and the greater part are not mowed at all, as there is a want of cattle to consume the fodder. Insects swarm amazingly. The district of Tara on the Irtysh, to the south-east of Tobolsk, comprehends a flat country covered with forests, and well stocked with game. Tara on the Irtysh is a handsome town.

The district of Koorgan is situated south from Yalutorowsk on the Tobol. The governor of Tobolsk, in describing it to M. Kotzebue, called it the Italy of Siberia. The ground is covered with beautiful flowers. Droves of horned cattle, and of horses, feed there without any keeper. Plenty of wood-cocks, wild ducks, and wood-pigeons are seen. The town of Koorgan, on the Tobol, resembles a collection of farm houses. Provisions are extremely low in price, but all articles of European manufacture are very high. Kotzebue describes in the following manner the amusements in which the young women of Koorgan indulge on the banks of the Tobol. "Along the rivers there are places where the young women come together to wash linen, and to bathe; these baths are converted by them into admirable gymnastic exercises; they cross and recross the Tobol, swimming gracefully and without effort, leaving themselves for a time to the force of the current, and lying on the water with their faces upward; they often pursue one another, or pelt one another with sand, duck, and upset one another, and plunge together; they remind the spectator of the Naiads of ancient fable; and so far do they carry their sport, that one not used to see them would apprehend every moment he should see them go to the bottom. The whole is conducted with the utmost decency; the head alone appears out of the water, and were it not for a slight glance of the form of the bosom, one might doubt of their sex. When about to finish their sport and go out of the water, they request the spectators to retire; and, should any one more curious or rude than the rest refuse, the women on the banks form a close circle round those who are coming out, and throw a piece of dress over each, so that every thing necessary to modesty in this particular is completed in an instant."

To the east of the preceding is the district of Ischim, which comes in contact with the great steppe of Issim, or Ischim, in which the Kirghisians of the middle horde wander. These nomades were formerly in the practice of carrying off the Russians, and dragging them along tied to the tails of their horses. In order to put a stop to these incursions, a line of military posts was established, extending from the banks of the Tobol to those of the Irtysh, along the margin of a valley full of salt lakes.[c] The fortress of Petropaulofskaia is the residence of the staff of this line. The district of Omsk on the Irtysh, near the steppe of Barabin, presents nothing remarkable. Omsk, its chief place, contains a great many exiles.

THE GOVERNMENT OF TOMSK comprehends the countries situated on the Upper Obi, and on the Yeniseï.

The province of Tomsk presents at its northern extremity the vast district of Mangasëisk, more commonly called Turukhansk, a series of forests, marshes, and deserts. The white foxes, white bears, and wolves, are larger here than in any other country of Siberia, and their hair is thicker and of better quality. Fish and aquatic birds abound. On the shores of the Frozen Sea, to the east of the Yeniseï, quantities of timber are thrown on shore.[d] The climate is more severe than on the Obi. The ice does not entirely disappear till the end of June. The elms, larches, willows, and birches, are only two months in leaf. The flowering of plants is more early. A species of flax grows here, with flowers of extraordinary size.[e] The town of Turukhansk, called also Mangaseïsk, contains a thousand people. The *simovié*, or cabins of the Cossacks, extend 330 miles[f] farther north: these hyperboreans are very much attached to their horrid country.[g]

To the south of Turukhansk, the district of Yeniseï extends along the river of the same name, and the Upper Tunguska or Angara. It produces corn, flesh, and fowl in abundance, but has no fruit trees. The town of Yeniseï, situated on the river, has a great trade. It is four miles[h] in circumference. Its inhabitants have the character of being cunning and deceitful dealers, and addicted to drunkenness and debauchery.

The districts of Narym, of Tchulym, of Tomsk, and of Kaïnsk, extend to the south-west of the two preceding. Narym, the most northerly, is a hunting country, possessing very few cattle, and no agriculture. There are some flocks in that of Tchulym. In the district of Tomsk, which lies on both sides of the Obi, the soil is very productive in all sorts of grain, and many horses and cattle are reared in it. The rivers are stocked with a great variety of fish. In this country, Mr. Laxmann discovered coal.

Tomsk on the Tom, a river which falls into the Obi on the east, ranks the third town of Siberia. Its population amounts to 11,000, and is daily increasing. Its central position will, perhaps, render it one day the capital of Siberia. Tomsk is the abode or resort of a very great number of Russian, Tartar, Bukharian and Kalmuk merchants. The greater part of the inhabitants belong to a sect called the Roskolniki, who are austere and ridiculous in their maxims, but are said to give themselves up in secret to debauchery and drunkenness, though such accounts of despised sectaries are seldom to be trusted.

The district of Kaïnsk, which comprehends a part of the steppe of Barabin, abounds in ermines.

The province of Kolywan was, under Katharine II., a separate government. It is the southern part of

[a] Georgi, Russie, II. p. 1036.
[b] Pallas, Voyages, II. p. 506, (in 4to.)
[c] Pallas, Voyage, III, p. 51. (4to.)
[d] Gmelin, Voyage in Sibérie, III. . 126.
[e] Souyef, dans les Voyages de Pallas, IV. p. 458, (in 4to.)
[f] "500 versts."
[g] Georgi, Russie, II. p. 1057.
[h] "6 versts."

western Siberia. The country between the Obi and the Tom has a very fertile soil; but when visited by Pallas it was covered with birchwood, and very thinly inhabited.[a] Here the town of Kolywan has been built and rebuilt, sometimes in one place, sometimes in another. The modern Kolywan is a middling town on the Obi.

The district of Semipalatnoi, being the southern extremity of western Siberia, merits our particular attention in regard to its natural geography. The plain between the Obi and the Irtysh is of a saline nature. The banks of the Irtysh consist of hills of very deep moving sand. The cattle here are extremely liable to be cut off in multitudes by disease. In the southern part, which is more mountainous, the water in several places is bad, and gives rise to intermittent fevers.[b] This country is exposed to storms and hurricanes. The heights are generally arid, and none but the low grounds are susceptible of cultivation. The vegetation of wild plants, trees, and shrubs, becomes more beautiful in proportion as we ascend the mountains. The false acacia, the balsam poplar, the wild cherry, the white hazel, the white and red elder, the red currant, the privet, and all kinds of wild roses, cover the banks of the Ooba. Large yellow strawberries please both the taste and the eye. Hyssop, water-mint, hops, and wild hemp, adorn the banks of the Shoolba. The *Clematis orientalis* attaches itself to the trees in festoons. Limpid streams flow under the shade of the Tartarian honeysuckle, which here forms pretty large trees. In the Altaian mountains, plants more peculiar to Alpine temperatures, such as the *Gentiana verna*, the Alpine saintfoin, the *Dryas pentapetala*,[c] the *Polygala Sibirica*, the beautiful *Spiræa altaica*, the *Valeriana Sibirica*, the everlasting flower[d] called *Gnaphalium silvaticum*, display their elegant blossoms in the immediate vicinity of the snow.[e]

The mine and town of Schlangenberg, called by the Russians Zmeiewskaia-Gora, is the most remarkable place in this district. The mountain receives its name from the great number of serpents found in it. The Tchoodes had made extensive workings here long before the Russians.

In the environs of Barnaool, in the district of Biisk, the air is milder, and the summer warmer than in places more to the south, which are nearer the mountains. All kinds of pot herbs, and even artichokes, grow there. Barnaool is a mining town of nearly a thousand houses, and is famed for its forges. In its neighbourhood are lime-kilns, brick-works, and glass manufactures.

The district of Kutznesk, with a town of the same name, is situated around the sources of the Tom, and extends to the Yeniseï. It contains many very fertile and very agreeable places.

The district of Abakansk, to the east of the former, is on the Upper Yeniseï. Though full of mountains, it contains some excellent pastures, and some tracts which are fertile in grain. Near Abakansk the temperature is sufficiently genial for the culture of water melons. This district, like the whole of southern Siberia, contains a great many tumuli or sepulchral mounds: the Tartars call them the tombs of the Cathayans, or Li-Katei; and the ornaments of gold, and other metals, found in them, show the flourishing state of the ancient nation which raised them. There are likewise on the rivers Abakan and Tchulym human statues from seven to nine feet high, and covered over with hieroglyphics.[f]

As we go down the Yeniseï we arrive at the district of Krasnoiarsk, where the soil is so fertile that it requires very slight labour, and may be cropped for five or six years, or even more, in succession, without manure. In this quarter, grain and all sorts of provisions are very cheap, and the people indulge in good living and idleness. The sepulchral tumuli in the mountains of Krasnoiarsk contain arms, ornaments, cups and coins of gold, silver, copper, and iron; monuments of the active industry of the ancient inhabitants of Siberia.[g] Two walls of rock, one on the banks of the Koksa, and the other on those of the Biriuss, present inscriptions in unknown characters; they are called Pisanoi-Kamen, or "written rocks." There is a similar rock on the banks of the Tom, below Kutznesk, on which figures of animals are sculptured.

We now proceed to Eastern Siberia, included in the vast Government of Irkutsk, the four provinces of which, viz. Irkutsk, Nertchinsk, Yakutsk, and Okhotsk, supply us with good geographical subdivisions.

Irkutsk, the capital of all the government, is likewise the capital of the province which bears its name. This city, which is the seat of the governor and of the archbishop, is situated on the banks of the Angara, in a beautiful plain, forty miles[h] from lake Baïkal. It is one of the largest and finest towns in Siberia. It is fortified, and contains a population of 11,200 inhabitants, the greater part of whom are thriving traders. Their household furniture generally comes from China, the women dress in Chinese stuffs, and the ordinary beverage is tea. Diseases arising from vice are very general. A Japanese school of navigation is established in this city, in which native Japanese masters teach the language of their country, and persons from the Russian admiralty give instructions in the art of navigation.

The environs of Irkutsk are agreeable, the soil is fertile, and agriculture in a flourishing state. In proportion as we approach to lake Baïkal, the country becomes more and more mountainous. Game is abundant in the neighbourhood. There are elks, stags, wild boars, muir-fowl, hazel-grouse, and partridges. This country experiences frequent earthquakes.

Kirensk on the Lena has also a fertile territory, producing plants of extraordinary size. The sterlets and other fish which are taken in the neighbouring rivers, are the most delicate in all Siberia. The inhabitants of this country are disfigured by goitres of uncommon size; these are frequently seen even on the cows and oxen of the country.

The district of lower Udinsk, which extends west from that of Irkutsk, is almost entirely covered with dark and marshy forests, where the soil produces no-

[a] Pallas's Travels, III. p. 388.
[b] Pallas's Travels, III. p. 200.
[c] Dryas Anemonoides, Pall.; Geum anemoides, hodie.—P.
[d] "Immortelle de bois," wood-everlasting.—P.
[e] Pallas, III. p. 190, 201, 263, &c. Patrin, Voyage dans les monts Altaï
[f] Georgi, Russie, II. p. 1029. Pallas, Voyage, &c. Messerschmidt, &c.
[g] Georgi, ibid.
[h] "63 versts."

thing but moss and marsh plants, in a great measure similar to those of Russia and the north of Europe. The climate is excessively cold.

Kiakta, a town built on the frontier of Mongolia, in the district of Upper Udinsk, has become a place of note from the trade between Russia and China. It is commanded by Mount Boorgooltei, (the mountain of Eagles) which the Chinese reserved to themselves in the last demarcation treaty, on the pretext that its summit contained the tombs of their ancestors. Kiakta labours under a great want of good water. The environs consist of sand and rocks, a soil ill fitted for the culture of vegetables. The chief inhabitants are Russian merchants, or agents of the chief commercial houses of the empire. Their mode of life is polished and social. The merchants think that the best hospitality they can shew to a stranger, is to press him to drink all the different kinds of tea in succession. Their furniture, and part of their clothing, are of Chinese manufacture.

Selinginsk, another town of the district of Upper Udinsk, is situated in the neighbourhood of high sandy mountains, the successive crumblings of which begin to cover all its streets. The inhabitants are very little engaged in trade; their constitution and physiognomy present a strong mixture of the Mongolian. The Russians who are established here prefer, in their marriages, wives from the Buriats or Mongols. These alliances give origin to a breed called Karimki. The manners of the common people are very similar to those of the Buriats. The inhabitants in general even prefer speaking the Mongol language. The climate of Selinginsk is quite temperate; on all the high grounds with a southern exposure snow disappears in the month of March, and the flocks go to pasture about the twentieth day of the same month. Bushes of the wild pear, the *Ribes diacantha*, and the dwarf elm, are not found any where so abundantly. The mountains are covered with the *Robinia pygmæa*.[a]

This province has an astonishing variety of soil and climate; in one place narrow, gloomy, and cold valleys; in another, hot sandy plains; and a little way off, a surface of neutral salts.[b] At Selinginsk water melons thrive very well; while on the banks of the Uda corn seldom ripens. In general this country is ill adapted to agriculture, even with the utmost care.[c]

The province of Nertchinsk, which comprehends Russian Dauria, is covered with mountains. The plains met with here are, properly speaking, wide valleys. The mountains present on every hand nothing but perpendicular and projecting rocks, which seem suspended in the air. For this reason no country is richer in picturesque views and situations. The air may be compared to that of the Alps, the cold being rather keen even in summer. The most common wood consists of pines, larches, black and white firs, Siberian cedars, and black birch, which occurs in no other part of Siberia. The summits where the snow lies constantly, contain clumps of the pine of Libanus, dwarf birch, and some peculiar species of junipers and willows. The hazel and the oak make their appearance only beyond the river Argun in the Chinese territory. For rare plants and minerals this province surpasses all the rest of Siberia. Vegetation is very brilliant in this alpine region. To mention one example; we see entire mountains near the banks of the Onon, whose surface on one side is overspread with a lilac hue produced by the buds of the wild apricot, while the other seems carpeted with the deep purple of the rhododendrons with which it is covered.[d]

Nertchinsk, a frontier town, with a fort on the side towards China, is, next to Kamtchatka, the place of banishment most dreaded of any in Russia. The exiles sent thither are employed in the mines. The number in the place at a time is generally 1000, sometimes 1800, rarely 2000. Confounded in one single class, they are dressed and fed like the soldiers. Desertion is extremely difficult; they are not however oppressed with too heavy work. The Chinese always deliver up those who have made their escape, and insist on the infliction of an additional chastisement on them for having polluted their territory.

The province of Yakutsk comprehends the greater part of the basin of the Lena. Some southern stripes of land on the west side of the river enjoy a tolerable climate. But from this river to the promontory of Tchalaginskoi the country has nothing but mountains or morasses, and is excessively cold. Barley ripens in six or seven weeks, but the harvest is uncertain. The only sure means of subsistence are found in hunting. In this wintry region ice is employed as a protection from the cold in the following curious manner: The window panes are generally laminæ of transparent mica, called Muscovy glass; exterior to these, plates of transparent ice are set up and cemented by pouring on them a little water, which immediately freezes.[e] The short summer heats induce the Tungooses to go naked like the Americans, wearing only a small piece of leather round the middle. Several of them live on the roots of the orange-lily, which are very common, and which they convert into meal and bread. The Tungoos fishermen throw their lines into the rivers when scarcely thawed, and accompany their fishing with merry songs and nimble dances.

Yakutsk, situated on the west bank of the Lena, is the capital of the province. This town, consisting of about 600 indifferent houses, carries on a great trade in sables. In the vicinity of Olekminsk, the chief place of a district of the same name, some fields of barley are cultivated. This town consists of about twenty houses, with a church and fort. The inhabitants are descended from Russians who were sent hither when the fort was established for collecting the tribute of furs; but they have almost forgotten their native language and manners for those of their rude neighbours and dependents. The two districts of Olensk on the Olenek, and of Shigansk on the Lena, are vast deserts where hordes of Yakuts and Tungooses lead a wandering life. Olensk is the most northern place in the world that bears the name of a town. At Kumak-Surka, the Lena, issuing from the mountains,

[a] Pallas, IV. p. 142, 224, and 369, 4to.

[b] "Fonds salins," saline hollows, such as are common in the deserts of central Asia, where almost every pool is impregnated with salt.—P.

[c] Pallas, IV. 384, &c.

[d] Idem, IV. 313, &c. 4to.

[e] Gmelin, Voyage de Siberie. Georgi, Russie, II. p. 1102.

offers one of the most picturesque and majestic views that can be imagined.[a] The district of Sachiwersk is inhabited by Yookagirs. The tribute in these countries is levied by half-noble Cossacks, (or *Dvorianin*) who are settled at Yakutsk, and receive eight rubles, (about L.1. 5s.) of annual pay. These are the princes, and sometimes the dreaded tyrants of this Arctic world.

The Frozen Sea, on this part of the Siberian coast, seems to be full of islands. Those which are found opposite to the mouths of the Lena and the Yana, are, like the adjoining coast, great turf bogs on a base of eternal ice. Some of them contain half frozen lakes. These solitudes are the habitations of the bear and the reindeer. Islands more worthy of notice have been found to the north of Cape Sviaitoi. They had been visited in 1711 and 1724, but were afterwards forgotten, till they were re-discovered by the Russian merchant Liaikhoff, in 1774. He first surveyed two flat islands, the southernmost of which contains a lake. The sand and soft earth surrounding this lake, in falling to pieces, lays open collections of bones, and entire skeletons of buffaloes, rhinoceroses, and elephants. The ivory found here is as white and fresh as that which is brought from Africa. He found at a distance of seventy miles from the second island, an extensive coast, which the surveyor Chwoinof was sent to examine in the following year, and which has been recently examined by M. Hedenstrom. This land, which has been named New Siberia, presented a pretty high coast, where petrified wood was found in immense regular strata between strata of sand and clay. The bones of elephants are found in it in great abundance. There is a considerable river, which indicates that the land is not of very limited extent. It contains some plants; and traces of human beings were supposed to have been perceived.[b] This New Siberia is perhaps only an extremity of America or West Greenland, which would have been called a northern extremity had it been short of the pole; but if it has crossed it, its two opposite extremities must both be called southern; and those which look east and west must be viewed as the shores of gulphs or bays formed by the undulating line of the land.

The most easterly parts of Siberia are comprehended in the province of Okhotsk, a mountainous country, covered with marshy woods. Scarcely any plant subservient to human subsistence grows here, and provisions are brought to it from Yakutsk. Even the potatoe speedily degenerates.[c] The only town is Okhotsk, a sea port, from which the Russians fit out for Kamtchatka and America. Merchant vessels are built there.

The country of the Tchooktches, which forms the extremity of Asia on the north-east, supports among its rocks innumerable flocks of rein-deer. The inhabitants live partly in the hollows of the rocks; they also build cabins of the bones of whales.[d] The "Bear Islands," which skirt the north coast of the country of the Tchooktches, have more vegetation than those of Liaikhoff.[e] In Behring's Straits are the two islands Imoglin and Igeliim, probably the same as the "Clarke's Islands" of the English. They are inhabited by the Achutllach tribe, a set of intrepid fishermen, who cook their provisions over lamps formed in little cavities in the rocks, in which oil is burned with rush matches.

The large peninsula of KAMTCHATKA forms a district of the province of Okhotsk. This country is divided longitudinally by a chain of mountains, and its two sides are watered by an infinity of streams, generally neither large nor navigable. The most considerable of them are the Kamtchatka, the Awatsha, and the Bolshaia-Rieka. The winters of this country are of ten months' duration. It begins to freeze by the month of July, and the frosts often continue till May. But the cold is never very intense, the sea fogs keeping up a humid and comparatively mild state of the atmosphere. The winds, and in consequence of this the climate, are extremely inconstant, and the transition from summer to winter is often instantaneous. Several of the rivers never freeze. Agriculture has not succeeded in this peninsula even in its southern part. Barley and oats give at most a return of two or threefold, and that only in select spots. The moisture prevents the ears from ripening. At a certain distance from the sea they might probably succeed.[f] Corn is extremely dear, being brought all the way from Irkutsk. But the rearing of cattle might become an important object, as the pastures are excellent, and the grass tall and waving, like that of the savannahs of Louisiana.

Foxes, sables, hares, ermines, bears, and rein-deers, range this country in droves. The coasts are always surrounded by a crowd of cetaceous and amphibious animals, as whales, sea-bears, manatis, and sea otters or beavers.[g] Dabs, soles, lampreys, eels, and pikes, swarm unmolested in the rivers, being only eaten in times of scarcity. But the salmon, which is excellent, is regularly fished. When this fish ascends the rivers from the sea, it is in such numbers as to obstruct in some measuse their current. The dogs and bears, by Steller's account, devour at their leisure as many as they please. The herrings, which go up into the lakes to spawn, abound in them to such a degree, that they may sometimes be taken up in buckets. The birds are equally remarkable for their great number and the multiplicity of species. The sea birds are innumerable. Among the land birds may be mentioned swans, seven species of geese, and eleven of ducks. Eagles are used as food. The larch and white poplar are used for building houses and vessels. The birches, which abound, are employed for making sledges. The green bark of this tree is cut in thin slices, and eaten with caviare; and the sap of the same tree furnishes an agreeable drink. The willow and the alder are almost the only species used as firewood. The willow bark is eaten by

[a] Remarkable account of the islands of Liaikhof, &c. in Pallas's New Memoirs of the North, VII. p. 128—142, (in German.) Petersburg Gazette of 1810.

[b] Adams, Voyage, &c. Ephem. Geogr. XXV. 260.

[c] Melanges sur Okhotsk, dans Pallas, Nouveaux Memoires du Nord, IV. 146—162.

[d] Extract of the Journal of Iwan Kowalew, corporal of Cossacks, a native Tchooktche, in the preceding work, IV. 105—111.

[e] Journal of Leontiew, Andreiew, and Lissow's Expedition to the Bear Islands, in Pallas, Nouv. Mem. I. p. II. p. 231—237.

[f] Krusenstern's Voyage round the World, II. chap. 8. Compare with Pallas, Nouv. Mem. du Nord; Steller and others.

[g] These animals (*Mustela Lutris, L.*) are strictly otters, and have no affinity with the beavers. They are found on all the shores of the N Pacific.—P.

the inhabitants, and that of the alder is employed for staining leather. The root of the *lilium Kamtchatcense*[a] is often used for bread. Nettles are used instead of flax and hemp. There are many medicinal plants. Of the *fuci* which abound in the adjoining sea, the *fucus dulcis*, or *palmatus*, the *esculentus*, and *saccharinus*,[b] (so called from an efflorescence which it gives out of soft and glutinous matter, compared to sugar from its appearance,)[c] are eaten by the people like cabbage.

Nishni-Kamtchatsk, the capital, on the Kamtchatska river, Bolsheretzkoi and Petropaulovsk, on Awatsha Bay, are mere villages, or rather hamlets.

The Aleutian islands belong too evidently to America to be described along with Asia. But Behring's Island and Copper Island are entitled to follow our account of Kamtchatka, of which they appear to be an easterly extension. Behring's Island, which is the nearest to it, derives its name from the celebrated Danish navigator, whose active life was terminated on this desert shore. It is uninhabited. The rocks consist of granite. The cold on the sea shore is not rigorous, and fixed ice is never seen. But the tops of the mountains in the interior, estimated by Steller to be 6400 feet[d] in height, are perpetually covered with snow.[e] The island is destitute of wood, and surrounded with reefs. Mednoi-Ostrow, or Copper Island, takes its name from the circumstance of some native copper having been found on its western shore. It is in kidney-shaped pieces contained in the gravel of which the beach is formed, and situated in a sort of vein.[f] In 1762, the navigator Melenski obtained from it three or four hundred pounds weight. The vein is now exhausted. Both of these islands are inhabited by a prodigious number of the *isatis*, or polar fox. Sea otters, sea cows, and whales, collect here in troops.

Siberia, the general and particular description of which we now bring to a conclusion, presents a vast field to the projects of the politician, to the speculations of the merchant, and the reflections of the philosopher. Russia derives more than one great advantage from the possession of this third part of Asia. Protection to her European provinces from any attack on this side; millions of clear profit from the mines; a commercial communication with China and with America: such are the fruits which Russia derives from this conquest of a simple Cossack, Yermak Timofeiew, the Cortez of the hyperborean world. The Siberian trade is enjoyed as a monopoly by the Russian merchants. The great rivers of this country, the Obi, the Yeniseï, and the Lena, and their tributaries, approach and retire from one another so conveniently, that goods may be carried almost entirely by water from Kiakta to Russia in Europe. This passage occupies three years, that is, three short summers; the land route takes one entire year. In 1790, the freight by land from Kiakta to Petersburgh was six roubles or 19 shillings for every pood, (of 40 lbs.) and by water, only four roubles (or twelve shillings and eight-pence.)

Tobolsk is the chief emporium of the goods which come from Europe, and of those which come from Siberia and China, the greater part of which are conveyed into Russia on sledges in the winter. The caravans of the Kalmuks, which arrive at Tobolsk during the winter, bring thither provisions, and sometimes gold and silver, and when they leave it, take home different articles of copper and iron. The Bukharians, who also come at the same season, bring friezed lamb-skins and cotton stuffs from their own country, together with Indian silks, and sometimes precious stones. Tobolsk is the emporium of the furs destined for the use of royalty.

The other important places for the fur trade are Tomsk, especially for such as are sold to the Kalmuks and the Mongols; Krasnoiarsk, Yeniseïsk, Turukhansk, and in eastern Siberia, Yakutsk; the three last principally for the purchasing market.

Irkutsk is the first town of Siberia for activity and extent of trade. Its advantageous position lays open to it three commercial routes; that of Kiakta, that of eastern Siberia and Kamtchatka, and that of western Siberia and Russia. In the other towns the trade is that of simple transmission, here it is one of active commercial transactions. The traffic with China is in a great measure in the hands of the merchants of Irkutsk, the greater part of whom have warehouses and agents at Kiakta. It is likewise at Irkutsk that the greater part of the sea voyages to the islands of the eastern ocean and of the coast of America are undertaken by merchants, who form partnerships for that purpose. The Americo-Russian trade will probably at some future time bring the cabinet of Petersburgh into contact with English Canada, and the American states. This trade is now necessary for Russia, who without America could not furnish a sufficient quantity of furs for the Kiakta market, where she buys teas, nankeens, and silks, now articles of necessity with the inhabitants of Siberia. All the fair sex, even the wives of the Cossacks, use tea, and dress themselves with the manufactures of China. The Chinese merchant himself begins to feel a demand for something besides ermines and fine furs; he wants the cloths, glass, and other productions of European industry. This trade is partly conducted by barter and partly by money. The balance against Russia has been latterly more than four millions of livres, a disadvantage merely nominal: for it is certainly better to purchase tea and nankeens at first hand, and to pay the sledgemen and boatmen of Siberia for the transport, than to procure these goods from the maritime countries of Europe. If the balance of trade were in itself a solid principle of political economy, Russia might produce within her own territory, a great part of the objects of exchange necessary to re-establish this balance. But we may ask one question, with a reference to the great disputed question now alluded to: What object can Russia, or any other political community, have in procuring for herself influx and discou-

[a] "Lis saranne."

[b] See Mr. Turner's splendid work on the fuci, in which these plants are accurately and elegantly delineated.

[c] "This plant, when taken from the water, is covered with crystals resembling sugar, but consisting only of sea-salt combined with the glutinous matter of the plant."—P.

[d] "1000 toises."

[e] Steller's Account of Behring's Island, in Pallas's Nouv. Mém. II. p. 255—301.

[f] Jakowlew, director of mines, quoted by Georgi, Russie, II. p 1150. Steller's Account of Copper Island, in Nouv. Mém. p. II. 302-307

raging an efflux of the precious metals, if she does not mean to hoard them in a corner, without bringing them to use till some great national emergency calls for exertion, which is to be made by disgorging the store either among her own subjects in order to pay an increased army, or among allies and mercenaries, whose co-operation she might wish to procure? And in that case, would not the sudden production of the treasure prodigiously reduce its value? We do not mean here to discuss these questions, which belong to one of the most difficult and profound as well as most important departments of science, and are agitated in treatises devoted to the subject; but merely to intimate, *in transitu*, the danger of adopting precipitate conclusions

SYNOPTIC VIEW

Of the Provinces and Nations of Siberia.

Divisions.	Riches and Cultivation, in the order of their relative proportions.	Inhabitants, in the order of their relative proportions.	Towns, and their Population.
I. WESTERN SIBERIA.			
(Government of Perm.)			
Province of Ekaterinburg.			
1. District of Ekaterinburg	Mines. Forests. Some kinds of corn	Russians. Germans. Permiaks	Ekaterinburg, 6000 inhabitants.
2. — of Dalmatow	Forests. Agriculture. Pastures	Ditto	Kamenskoï-Ostrog, 1800.
3. — of Shradinsk	Agriculture	Ditto	Isetskoï-Ostrog, 2600.
4. — of Kamyshlowa	Ditto	Ditto	Kamyshlowa, 1100.
5. — of Alepoewsk	Mines. Pastures	Ditto	Nishneï-Newiansk, 6 or 7000.
6. — of Irbit	Agriculture. Pastures. Orchards.	Russians. Permiaks	Irbit, 2400. (Fair.)
7. — of Werchoturia	Scanty cultivation. Forests. Mines	Russians. Woguls	Werchoturia, 3000.
(Government of Orenburg.)			
District of Troïtzk	Pastures. Forests	Russians. Bashkirs	Troïtzk, 1500.
(Government of Tobolsk.)			
(A single Province.)			
District of Omsk	Barley, millet, rye, &c. Hemp	Barabintzes. Russians	Omskaia, 2000.
— of Issim	Pasture. Corn. Salt Lakes	Russians. Cossacks. Tartars	Issim, 1000.
— of Koorgan	Pasture. Corn. Wood. Fruits	Russians. Cossacks	Koorgan, from 1 to 2000.
— of Tara	Barley, rye, buck-wheat, to the west of the Irtysh. Pasture, to the east	Russians on the west of the Irtysh. Tartars. The same and Barabintzes on the east	Tara, 2140.
5. — of Yalutorowsk	Rye, barley, and all kinds of corn. Pasture	Russians	Yalutorowsk, 2070.
6. — of Tioomen	Rye, (uncertain) barley, oats. Few pot-herbs. No fruits	Russians. Tartars	Tioomen or Yepankha, 7 or 8000.
7 — of Turinsk	Rye, barley, oats, in the plain and to the south	Russians. Tartars. Woguls	Turinsk, 4000.
8. — of Tobolsk	Rye, barley, and oats, in the southern parts	Russians. Tartars	Tobolsk, 12,260 (17,000.)
9. — of Soorgoot (Surgut, p. 358.)	No corn. No European cattle	Ostiaks of the Obi. Russians.	Soorgoot, 1500.
10. — of Berezof	Rein-deer, bears, sables. No cattle	Ostiaks. Samoiedes. Russians. Woguls	Berezof, 1500.
(Government of Tomsk.)			
1. *Province of Tomsk.*			
1. District of Turukhansk	No corn. No pastures. Rein-deer, Siberian dogs, &c.	Ostiaks of the Yeniseï. Tungooses. Samoiedes. Russians. Cossacks. Yookaghirs	Turukhansk, 1000.
2. — of Yeniseïsk	Scarcely any culture	Tungooses. Russians	Yeniseïsk, 6000.
3. — of Narym	Scarcely any corn. Few cattle	Ostiaks of Narym, or Samoiede Ostiaks. Russians	Narym, 1580.
4. — of Tchulym	Rye, barley, (uncertain)	Russians. Tartars	Tchulym or Atchinsk, 5 or 600.
5. — of Tomsk	Rye, barley, oats, &c.	Russians. Tartars. Samoiede Ostiaks. Katchinzes	Tomsk, 11,000.
6. — of Kainsk	Pasture. Fisheries. Corn	Barabintzes. Russians	Kainsk, 3000.
2. *Province of Kolywan.*			
7. District of Krasnoiarsk	Pastures. Rye, wheat, barley, &c.	Russians. Teleoots	Krasnoiarsk, 3500.
8. — of Abakansk	Pasture. Little corn	Russians. Teleoots. Sayanians. Karagasses. Soyets. Koïbales. Biriusses, &c.	Abakansk, 4 or 500.
9. — of Kutznesk	Pasture. Corn. Mines	Russians. Tartars. Abinzes, &c.	Kutznesk, 3000.
10. — of Kolywan	Corn of different species. Mines	Russians. Tartars, &c.	Kolywan, 2 or 3000.
11. — of Biisk	Mines in the south. Grain. Pasture	Russians. Tartars	Barnaool, 6000.
12. — of Semipalatnoï	Mines. Pastures. Salt Lakes. Fisheries	Russians. Barabintzes	Sméogorsk or Schlangenberg, 15 or 1600.
II. EASTERN SIBERIA.			
(Government of Irkutsk.)			
Province of Irkutsk.			
1. District of Irkutsk	Rye, wheat, oats. (Exportation)	Russians. Buriats. Tungooses	Irkutsk, 11,250.

Table continued.

Divisions.	Riches and Cultivation, in the order of their relative proportions.	Inhabitants, in the order of their relative proportions.	Towns, and their Population.
2. District of Upper Udinsk .	Rye, wheat, oats, millet, buck-wheat. Hemp (in the valleys) .	Russians. Mongols. Buriats. Karinski or Half-breeds . . .	Sélinginsk, 2600.
3. — of Lower Udinsk . . .	Rye, wheat, oats.	Russians. Buriats. Soyets . .	Nishneï-Udinsk, (Lower Udinsk,) 1500.
4. — of Kirensk	Rye, spring wheat, barley. Soil excellent. Climate unfavourable .	Russians. Tungooses	Kirensk, 3 or 400.
Province of Nertchinsk.			
5. District of Nertchinsk . .	Mountainous. A little rye, spring wheat, barley. Hemp . . .	Russians. Buriats. Tungooses .	Nertchinsk, 2000.
6. — of Doroninsk	Mountainous. Tillage in the valleys	Russians. Mongols, &c. . . .	Doroninsk, from 2 to 300.
7. — of Bargusinsk	Little cultivation. Forests. Salt and bitter lakes	Russians. Buriats of Chorinsk, (Chorinskii Batzkii.)	Bargusin, from 2 to 400.
8. — of Stretinsk	Mines. Game. Fish	Buriats. Russians	Nertchinskoï Sawod, from 900 to 1000.
Province of Yakutsk.			
9. District of Yakutsk . . .	Game. Fish. Attempts to cultivate barley	Russians. Yakuts	Yakutsk, 4000.
10. — of Olekminsk	A little barley. Rein-deer. Transparent mica	Yakuts. Russians	Olekminsk, 300.
11. — of Olensk	Rein deer. Fish. Game . . .	Yakuts. Cossacks	Olensk, 100 or 150.
12. — of Shigansk	Game. Fish. Fossil ivory, &c. .	Yookaghirs. Cossacks	Shigansk, id.
13. — of Sachiwersk	Game. Fish	The same	Sachiwersk, id.
Province of Okhotsk.			
14. District of Okhotsk . . .	No culture. The potatoe does not thrive	Tungooses. Russians	Okhotsk.
15. — of Ishiginsk	Rein-deer, &c. Cresses. Dwarf potatoes	Koriaks. Cossacks	Ishiginsk, 500. (Fair of the nomadic tribes.)
16. — of Aklansk	Rein-deer. Bears. Fish	Tchooktches. Koriaks. Cossacks .	Aklansk, 100 or 200.
17. — of Nishneï-Kamtchatsk .	No culture. Pasture. Bears. Rein-deer. Dogs	Cossacks. Russians. Kamtchadales	Petropaulovsk, 120 or 150.

TABLE OF DISTANCES

Of some of the Siberian Towns, (in English Miles,) from official Measurements.[a]

Petersburgh									
2076	*Tobolsk*								
3383	1305	*Irkutsk*							
3028	952	853	*Tomsk*						
. . .	. . .	1657	. .	*Yakutsk*					
. . .	556	. . .	. . .	. . .	*Berezof*				
. . .	1981	. . .	. . .	. . .	(716)	*Turukhansk*			
. . .	. . .	2324	. . .	666	(1576)	860	*Olensk*		
6172	4096	2290	3143	633	. . .	. . .	. . .	*Okhotsk*	
7800	5722	3917	4103	2260	. . .	. . .	. . .	1626	*Nishnei Kamtchatsk.*

a. In the original in versts—reduced to English miles, at the rate of two miles to three versts nearly.—P.

Table of Geographical Positions in Siberia, Astronomically observed.

Names of places.	Long. E. from London.	Lat. N.	Authorities.
	deg. min. sec.	*deg. min. sec.*	
Abakanskoi-Ostrog .	. . .	54 7 0	Messerschmidt, Ephémérides Geogr. XVI.
Argoon river (at its issue from lake Dolaï)	. . .	49 17 0	Idem. Ibid.
Awatsha	158 46 45	52 51 45	Connaiss. des Temps.
Barnaool	83 27 0	53 20 0	Petersburgh Calendar, published by the Ac. of Sciences.
Berezof	. . .	63 56 14	Idem.
Bolcheretzkoi-Ostrog	156 50 15	51 54 30	Connaiss. des Temps.
Cape of Kamtchatka	162 0 15	55 55 0	La Perouse.
—— of Olutorskoi	169 15 15	59 48 0	Idem.
—— of Tchukotchoi, north . . .	190 16 15	66 5 30	Petersburgh Calendar.
—— of Tchukotchoi, south . . .	186 29 15	64 14 30	Idem.
—— of St. Thaddeus	179 5 15	62 50 0	Connaiss. des Temps.
Ekaterinburg . . .	60 40 15	56 50 38	Table of observations annexed to the map of Russia in 12 sheets.
The same	60 50 15	56 50 15	Connaiss. des Temps.
Iakutsk	129 42 30	62 1 50	Idem.
The same	129 44 0	(Idem)	Petersburgh Calendar.
Ieniseisk	91 58 45	58 27 17	The same.
Irkutsk	104 11 33	52 16 41	The same.
The same	104 33 45	52 18 15	Connaiss. des Temps.
Kiakta	. . .	50 20 0	Petersburgh Calendar.
Kirenskoi-Ostrog .	108 3 0	57 47 0	Connaiss. des Temps.
Kolywansk . . .	. . .	51 19 23	Petersburgh Calendar.
Kowyma (Lower) .	163 18 15	68 18 0	Connaiss. des Temps.
Krasnoiarsk . . .	102 57 46	56 1 2	Petersburgh Calendar.
The same	. . .	56 9 30	Messerchmidt, Eph. Geogr.
Narym	. . .	58 54 0	Petersburgh Calendar.
Nertchinsk . . .	. . .	51 56 0	The same.
The same	. . .	51 57 0	Messerschmidt, Eph. Geogr.
Okhotsk	143 12 45	59 20 10	Petersburgh Calendar.
The same	143 13 45	(Idem)	Connaiss. des Temps.
Olekminsk	119 34 45	60 22 0	Petersburgh Calendar.
Omskaia fort . . .	. . .	54 58 5	The same.
Petropaulofskaia, port	178 48 0	53 1 20	The same.
The same	178 49 0	53 0 15	Connaiss. des. Temps.
Saianskoi-Ostrog .	. . .	53 10 0	Messerschmidt, Eph. Geogr.
Selinginsk . . .	106 38 45	51 6 6	Petersburgh Calendar.
The same	106 32 30	(Idem)	Ephem. Geogr. XVI.
Semipalatsk . . .	. . .	50 29 45	Petersburgh Calendar.
Smenogarskaia (fort) or Schlangenberg .	82 9 45	51 9 25	Table of the map of Russia.
Surgut	. . .	61 16 0	Petersburgh Calendar.
Tobolsk	68 25 15	58 12 30	Connaiss. des Temps.
The same	68 5 58	58 11 43	Petersburgh Calendar.
The same	68 5 59	58 11 48	Table of the map of Russia.
Tomsk	84 59 45	56 30 0	Connaiss. des Temps.
The same	85 9 51	56 29 39	Petersburgh Calendar.
Lower, or Nishnei Udinsk	99 1 46	54 55 22	The same.
Udskoi-Ostrog . . .	. . .	55 18 0	The same.
Werchoturia . . .	. . .	58 50 15	The same.

Agricultural Table of some of the Provinces of Siberia.

Districts.	Corn-fields, in acres.*	Forests, &c.	Meadows.
Delmatow . .	279,730,360.	664,129,592.	
Shradinsk . .	330,035,275.	59,925,987.	60,134,342.
Kamyshlowa .	348,794,097.	286,700,000.	
Irbit . . .	162,297,632.	57,857,547.	63,237,690.
Werchoturia .	306,246,132.	512,281,742.	121,355,467.
Turinsk . .	28,675,000.	745,420,000.	
Tioomen . .	48,012,500.	430,050,000.	
Yalutorowsk .	129,015,000.	1,003,450,000.	
Issim . .	8,602,500.		
Tara . .	64,507,500.		
Yeniseïsk . .	2,867,500.		

* In the original, estimated in *dessaitins*, a Russian measure equal to 1,158 hectares, and to 2,867. acres.—P

Chronological Table of Discoveries made in Siberia.

1242. The Tartars enter Siberia under Scheiban, who founds the Khanat of Sibir or Tura.
1246. Carpini mentions the Samoiedes as now included in the conquests of the Mongols.
1558. Troganow trades in Siberia.
1563. Iwan Wasiliewitch introduces Siberia into the titles of the Russian Czars.
1580. Yermak Timofeiew, at the head of some Cossacks, invades the Khanat of Sibir, or western Siberia.
1584. The Russians leave Siberia.
1587. They build Tobolsk.
1598. The death of Kutchum-Khan puts an end to the resistance of the Tartars.
1604. The city of Tomsk built.
1618. Ieniseïsk and Kutznesk are built.
1621. Cyprian, metropolitan of Tobolsk, publishes a description of Siberia.
1636. Russian vessels sail down the Lena, and explore the shores of the Frozen Sea.
1639. Dimetreï Kopilow reaches to the shores of the Eastern Ocean.
1646. Bomyshlan sailed round from the Kowyma to the Anadyr, doubling Cape Tchukotchoi in Behring's Straits.
1648. Deschnew, another Cossack, made the same voyage.
1648–58. Irkutsk, Yakutsk, and Nertchinsk, are built.
1690. Kamtchatka known at Yakutsk.
1695. First Russian expedition to Kamtchatka.
1706. The Russians make the south point of Kamtchatka.
1711–24. The merchants of Yakutsk visit the islands and countries north of the mouths of the Lena and the Yana.
1720–26. Daniel Messerschmidt travels in Siberia as far north as Turukhansk, and as far east as Nertchinsk.
N. B. He was a native of Dantzick, and died in extreme misery at Petersburgh, in 1735. His numerous papers, preserved in the archives of the Academy, have furnished extracts to his successors.
1721. Baron Strahlenberg travels to the Ieniseï. He was originally a Swedish captain, by the name of Tobbert, and author of a work on northern and eastern Asia, 1730.
1727. Vitus Behring, a Dane, coasted eastern Siberia, from the Pacific, as high as 67° 18′ N. Lat., doubling Cape Tchukotchi, but without discovering the opposite coast of America.
N. B. This navigator was born at Horsens in Jutland, and died, in 1741, on the island which bears his name.
1733. Behring, Muller, Gmelin, and Louis de l'Ile de la Croyère, set out on a great expedition.
N. B. The last-mentioned person, a French geographer and astronomer, died, in 1741, on the coast of America.
1733–43. John George Gmelin, the botanist, explored Siberia as far east as Yakutsk and Kirensk, as far north as Turukhansk, and to Nertchinsk and Syanskoi-Ostrog on the south.
N. B. This naturalist was born in 1709 at Tubingen in Suabia, and died there in 1775. He was author of the Flora Sibirica, and uncle to Samuel Gmelin, traveller in Persia, who died 1774
—— At the same time Muller and Fischer travelled along with Gmelin, in the character of historians and antiquaries.
N. B. Muller, historiographer, counsellor of state, &c. was a Westphalian by birth, and died at Moscow in 1784. Fischer, a Livonian, member of the Academy of Petersburgh, died in 1771.
1738. Lieutenant Owzin sailed from the Obi to the Yeniseï.
—— Lieutenant Laptiew travelled by land along the coast, from the Yenisei to the Lena.
1739–40. This officer sailed from the Lena to the Kowyma.
1740. George William Steller, naturalist, arrived in Kamtchatka, and remained there till the end of 1743.
N. B. He was a native of Franconia, and died in misery in 1745. He was author of a description of Kamtchatka, (1744,) the manuscript of which was used by Krashenninikow. His other manuscripts, viz. Syllabe Plantarum Tobolensium, Flora Kamtchatika, Ornithologia Sibirica, and Ichthyologia Sibirica, were preserved by the Academy of Petersburgh, and furnished extracts to subsequent travellers.
1760. The Academy of Sciences sent a list of questions to all the governors, and other persons likely to collect local information.
—— Pleisner, a Courlander, commandant of Okhotsk, ascertained, by a variety of researches, that the country of the Tchukotches is a peninsula, separated from America by a strait containing two islands.
1764. Sind, lieutenant of a Russian vessel, examined Behring's Strait and the adjoining coast of America.—A merchant vessel sailed from the Kowyma to the Anadyr.

1765. Eric Laxmann travelled over Siberia as far as to the north of Kamtchatka.

N. B. He was a Finnish Swede, a clergyman, afterwards an academician, counsellor of mines, knight, &c. He died in 1796. It is matter of much regret that he committed so little to writing.

1768–74. Peter Simon Pallas, a native of Berlin, made his great tour; spent the years 1770-1773 in Siberia; and went as far as Dauria. Souiew his associate visited Obdoria.

1771. Nicholas Rytschkow, a Russian captain, and Bardanes, an Illyrian *savant*, travelled over the steppe of Kirguis along with a Russian detachment.

1771–2. John Peter Falk, a learned botanist, travelled in Siberia. His papers were published, in 1785, by Georgi.

N. B. Falk was a Swede, and a pupil of Linnæus, of respectable attainments, but the victim of jealousy and intrigue. He destroyed himself by a pistol-shot, in 1774.

1772. Georgi, colleague of Falk, made a minute examination of lake Baikal, and the Daurian and Uralian mountains, &c.

N. B. John Gottlob Georgi was a native of Swedish Pomerania, author of the best statistical account of Russia

1775. Liaichow and Chwoinow visited a large country, (island or continent?) to the north of Cape Sviaitoi.

1787. Billings, an Englishman, made an unsuccessful attempt to sail round from the river Kowyma, by Behring's Strait, to the Anadyr.

1791–93. Billings navigated the Kamtchatkan seas. The accounts of this ill-directed expedition have been collected by Sauer, a German, and Sarytschew, a Russian.

1790–95. Sievers, a botanist and apothecary, travelled in the southern mountains of Siberia.

N. B. Sievers, a German, was another victim. He killed himself by poison. Some of his plants have been published by Pallas.

1804. The expeditions of Krusenstern, Langsdorf, Tilesius, &c.

This Table has been extracted from Fischer's History of Siberia, Müller's Collection of materials for the History of Russia, Georgi, and others.—It does not include the voyages to the Aleutian Islands, those to the Kurile Islands and to Iesso, nor those to Spitzbergen. These countries come into view in other parts of our work.

BOOK XXXIX.

CENTRAL ASIA.

Comprehending Little Bukharia, the Kalmuk country, and Mongolia.

We return from the northern extremities of Asia to the central zones, which are only known to geography by vague traditions and antiquated descriptions. The traditions often serve to thicken the darkness in which we wander. The old descriptions furnish very deceitful lights; for, since the thirteenth, fourteenth, and fifteenth centuries, in which these countries were freely travelled, we know not how many cities may have disappeared, how many nations have become extinct, how many cultivated fields may have been suffered to lie waste, nor how many deserts may have been clothed with the benefits of cultivation. An analysis of the accounts of Carpin, of Rubruquis, of Marco Polo, Pigoletti and Haïthon, will figure in the general view which will be given of the history of geographical research in the middle ages;[a] but it is only for want of better materials, and with circumspection and reserve, that we shall adopt some of their descriptions on the present occasion.

The central part of Asia, from which we separate Thibet, includes five geographical divisions: Mongolia, or Mongolistan, properly so called, on the north of China, and to the south of Irkutsk; the Kalmuk country, which we may denominate Kalmukia, called also Songaria, on the west of Mongolia, and to the south of Kolywan; Little Bukharia, or eastern Turkestan, to the east of Great Bukharia, and to the north of Cashmere and Little Thibet: Tangut, or the country of the Eleuts of Koko-Nor, or the eastern Kalmuks; and, lastly, in the middle of these four countries, the desert of Cobi, with the Oases of Lop, of Hamel, and others. A small part of Songaria and Little Bukharia seems to have been included in what the ancients called *Scythia beyond Imaus*. The direction of the rivers, and perhaps a sight of lake Palcati-Nor, gave rise to the supposition that the northern ocean was but a short way off; and the Mongolian name of Daba, which is the general term for a mountain, was applied to the pretended promontory of Tabis, considered as terminating Asia to the north-east in the country of the Igoors. The *Serica* of the ancients seems to have included the western parts of Thibet, Serinagur, Cashmere, Little Thibet, and perhaps a small part of Little Bukharia.[b] That name, known to Ammianus Marcellinus in the fourth century, disappeared in the fifth. Moses of Chorené mentions, indeed, a town called *Syrrhia*, which is *Sera* the metropolis, but he gives the country of which it was the capital the name of *Djenia*, or Djenistan.[c] He seems to comprehend under this name central Asia, and particularly Little Bukharia. He places the country of *Sena*, or China, more to the east. Perhaps the term *Djenia* might have been given in consequence of some ancient conquest which the Chinese had obtained over these countries, or it might signify "the country of genii, or of gods," as that of *Serica* may denote in Sanscrit "the country of happiness." Whatever be the fact in this case, it appears that, six centuries later, these countries went under the general name of Cathaya, or properly Kitay, which was divided into white or independent Kitay, and black or tributary Kitay.[d] It is uncertain whether this word was the proper name of northern China, or an appellation derived from a Tartar term signifying "Desert Mountains." At all events, Kathay made a conspicuous figure in geography from the thirteenth till the middle of the seventeenth century. It is certain that the name chiefly ap-

[a] See history of geography in a subsequent volume.

[b] The opinion here given on the geography of the ancients, and which is stated and supported at some length in the author's history of geography, has been rendered less probable by various subsequent discoveries made by British officers on the actual physical geography of the mountainous parts of Asia, which lie immediately on the north of India. Accordingly, the opinion of M. Gosselin, here acquiesced in, is combated in a learned memoir by Mr. Hugh Murray, inserted in the Transactions of the Royal Society of Edinburgh, volume VIII. p. 171, in which the *Seres* are maintained to be, identical with the Chinese. The arguments are partly founded on a confidence in the general correctness of Ptolemy, as confirmed by these discoveries, which, while they subvert the views recently entertained, restore, so far as they go, the geography of that author. The length of the journey of the caravans which went from western to eastern Asia, in the silk trade, and the localities referred to in the account of Ptolemy, induce the belief that the ancient *Serica* was nothing else than China. From *Bactriana*, where their route begins to be matter of controversy, they first ascended the Beloor, apparently by the valley of the Oxus laid down in Mr. Elphinstone's map; then descended into a plain abundant in pasture, but not arable, (Pamer plains) then ascended a valley, probably the valley of Ladâk, to the "stone tower," a great rendezvous for the caravans (though this singular appellation has never yet been explained,) situated most probably on a lofty ridge lying north and south, and separating Little from Great Thibet. This ridge is considered as the *Imaus versus ad Arcton*. From this point, their journey to the country of the *Seres* occupied seven months, a period which, allowing for the slowness of their progress, as well as some exaggeration, was amply sufficient to bring them to the heart of China, but inconsistent with any hypothesis which makes *Serica* either Little Bukharia, the Two Thibets, the north of India, or a country made up of these, or of portions of them. The account given of the *Seres*, their manners, their prejudices, their produce, and their manufactures and trade, corresponds in every particular to the picture presented by China as now known, and as it is described to have invariably existed from time immemorial. Little Thibet, according to this view, was the *Scythia intra Imaum*, the country of the *Sacæ;* Great Thibet, the *Scythia extra Imaum*. These points will be more fully considered in the history of geography. Though not warranted to alter the author's text in cases in which a difference of opinion might be entertained, we think it necessary to allude, as in the present instance, to later discussions conducted under greater advantages. Corrections of geographical facts founded on actual discoveries are, however, every where introduced without scruple, and without the ceremony of a formal intimation. On the present question, we must refer the reader to the interesting memoir now mentioned, and also to Mr. Murray's more recent work, entitled, "A Historical Account of Discoveries and Travels in Asia," in 3 Vols. 8vo. Vol. I. p. 485, &c. In this work, however, the argument is interspersed with other materials, and appears less pointed and consecutive than in the memoir.—Tr.

[c] Mos. Chor. Histor. Armen.

[d] And. Muller, Disquisitio, Geogr. et Histor. de Cathaya. (Berlin, 1670.) Compare with Hyde Syntagma Dissert. I. Itin. mund. p. 31.

plied to the north part of China, which long formed a separate monarchy, but it probably extended at the same time over part of Mongolia and of Tangut. The meaning of the term *Kara-Kithay*, or tributary Cathay, must have varied with the fortunes of war.

A name still more vague has long been applied in our maps, not only to the central zone, but also to all the northern and eastern part of Asia. This is TARTARY, with its divisions. In the thirteenth and fourteenth centuries, this name was given to the whole empire of the Mongols under Genghiz-Khan, and that of the Tartars under Tamerlane. During the dismemberment of this latter monarchy, a descendant of Genghiz-Khan, called Isan-Boga-Khan, founded a separate state in Little Bukharia, of which Bishbalig, and afterwards Cashgar, were the capitals. About the same time, the four confederate tribes of Kalmuks, which call themselves *Derben-Œrœt*, or "the four brothers," and are called by the Europeans Eleuts, re-established their ancient independence, and elected a sovereign, on whom they conferred the title of *Contaish* or *Khantaidsha*. At this epoch, the power of the Mongols in China was extinguished; the descendants of Genghiz-Khan retired to Karakorum, a place which under Genghiz had been the capital of the whole of Asia, but was now merely the chief place of the horde of the Kalkas. Divided among themselves, the Mongols gradually became tributary to the Chinese, and afterwards to the Mantchoos, the new masters of China. Russia, after destroying the Tartar kingdoms of Astrakan, Kasan, and Siberia, subjugated some Mongolian tribes in the neighbourhood of Lake Baïkal. These different revolutions produced the famous distinction in geography between Muscovite or Russian Tartary, including Astrakan, Kasan, and Siberia; Chinese Tartary, consisting of the country of the Mongols and Mantchoos; and Independent Tartary, consisting of the states of Great and Little Bukharia, that of the Eleut-Kalmuks, the Kirghis, and the Turcomans. This threefold division, now entirely rejected, had been already thrown into confusion half a century ago. The Kalmuks, who in 1683 had conquered Little Bukharia, and had become formidable to China and to Russia, experienced, after fifty years of power and glory, all the miseries of civil war. The Chinese, employing against them the arms of the Mongols, subdued them, and still hold them in a state of vassalage. Chinese Tartary should, at the present day, extend over the whole central plateau of Asia; but it is more advisable to reject the term entirely.

We have already traced the mountain chains which support or circumscribe the central plateau of Asia; we have followed the courses of the rivers which water that icy region. If it is asked, what are the structure and composition of that chain? we are presented only with a long series of uncertainties and conjectures. Does this plateau maintain nearly an equal level; or is it more elevated at one or more central points? Is it interspersed with some groupes of mountains which are of moderate elevation above their immediate bases, like the mountains of Algydim-Shalo in the Kirghis country? or may the permanence of the snow on the summits of the great Altaï and the great Bogdo be considered as a proof of a greater elevation in the interior of the Kalmuk country? Is the same elevation continued along the deserts by which that country is separated from Thibet? Are these deserts entirely occupied by plains of black sand, as has been hitherto asserted, or do they contain secondary mountains? Is the granitic nature of the Altaïan, Sayanian, and Daurian mountains, common to the great chains in the interior, if such chains exist? or do the latter consist solely of masses of hardened clay, mixed with gravel,[a] like the mountains in the neighbourhood of the great wall, mentioned by Staunton? or, what certainly appears more probable, does this centre of the great continent of Asia contain immense seas of sand, and a chaotic mixture of all the elements of the globe. There seem to be no volcanoes in it in a state of activity; but may not this great extent of land afford some traces of ancient volcanic revolutions, like those observed by M. Patrin in Dauria? In fine, does this region, so near to India, contain, like Siberia, bones of the elephant and the rhinoceros?

These are important questions, and the list might be farther extended. It is curious to find that hitherto they remain unanswered. This great region, forming a sixth part of the old continent, has not been seen by any of our geologists, who display with so much confidence their theories of the earth.

The mineralogy of these countries is equally unknown. The tin mines said to exist in the country of the Mongols, strictly so called; the name of "Golden Mountains," (Altaï,) given to one great ridge; the tradition of the great antiquity of the art of mining among the Mongols who live near the rich mines of Russian Dauria; the instruments and vessels of gold and iron found in the ancient tumuli; and, finally, the opinion that the rivers of Little Bukharia furnish the gold dust, which forms an article in the commerce of Kiakta: these constitute the feeble proofs which we possess of the mineral treasures of this great region.

All accounts agree in representing the cold of central Asia as extremely rigorous; and its elevation and latitude would lead us to the same conclusion. La Perouse found the coasts of the Mantchoo country, under the parallel of 49°, covered with snow in August. The ambassadors of Shah Rokh saw, in the Kalmuk country, the ground frozen, at the depth of two inches, at the summer solstice.[b] Yet some more temperate countries are found in the interior.

The vegetation of the centre of Asia, including even that of Thibet, is almost entirely unknown to us; these vast countries never having been explored by any able naturalist. The elevation of their soil and the rigour of their winters might lead to a presumption that they contain no plant belonging to the more temperate parts of Asia. Yet the cotton plant and the vine have found their way thither. From the vague accounts of ancient travellers, and the little that we know of the vegetables which grow on the maritime coasts of Tartary, it would appear that the plants are partly the same that are found in the north of Germany, mixed with several of the Siberian species.

The vast extent of central Asia undoubtedly contains

[a] Pudding-stone?—P.

[b] Forster's Northern Discoveries, I. 254

new species, and perhaps a Flora altogether peculiar, but we do not yet know any of its peculiar and indigenous plants, except the singular fern called *Polypodium barometz*,[a] or the Tartarian lamb, (which is figured and described in Darwin's Botanic Garden,) and the different species of rhubarb. These last grow on the mountains; the fern, just mentioned, in the steppes.

The animals which roam at large in the deserts become known by making their appearance in occasional visits which they pay to Siberia and to China. All the species which are useful to man are found here in a state of nature. The wild horse is called by the Kalmuks[b] *takia*, and by the Mantchoos *tahi*.[c] The *koolan*, or wild ass, inhabits the steppes and open plains; he rarely passes beyond the latitude of 48°.[d] His flesh is used for food. A third solipedous quadruped,[e] which holds an intermediate place between the ass and the horse, the *djiggetaï* or *hemionus*, collects in troops on the banks of the Onon, the Argun, and the Amur, in the desert of Cobi, and as far as the confines of China and Thibet. He is often tamed. He shows more intelligence than the common ass, but does not entirely lose the wildness of his disposition.[f] The two-humped or Bactrian camel, wanders independent in the sandy deserts of Mongolia. The Yak, or wild grunting ox, (the *Vacca grunniens* of Gmelin, and the *Bubalus* of Pallas,) frequents the moist and open meadows. His reflected horns, his soft silky hair, four inches long under the belly, and his tail resembling that of the horse, show that he is not the original stock of our domestic ox.[g] This animal is called *Kalo* in the Bukharian and Tangut languages, and *Sarluk* by the Kalmuks. An experiment made at Irkutsk proved that he could be raised and managed like our black cattle, but the milk of the female has an unpleasant taste of tallow.[h] The mountains in which the river Amur takes its rise[i] mark the limits which nature has prescribed to the rein-deer on the south, but the elk is found as low as the parallel of 45°. The argali or wild sheep, the goat, the chamois, the wild goat of Caucasus, the *Antelope gutturosa*, and the saiga, which is probably the yellow goat of Duhalde,[k] wander in flocks on the steepest mountains. The *moschus moschiferus*, or musk animal, which delights in boundless solitudes, inhabits Mongolia, Dauria, and the mountainous countries of the river Amur; on the south he finds his way to Thibet, to China, and to Tonquin; and on the west, to the mountains of Cashmere: on the north, Pallas found him on the banks of the Yeniseï, in the neighbourhood of Krasnoiarsk.[l] Among the animals of the ferocious kind, are the brown and the black bear, the common fox, the korsak and the karagan, the white lynx, called *irgis* by the Kalmuks, the karakal,[m] (more properly Kara-kulak or "black ear,") and the manul, the three latter species of the cat kind, like the ounce and tiger. The ounce is well known here, and is called Djulbars in the Kirghisian and Bukharian languages; but it is not a matter of certainty whether the true tiger has been seen. Central Asia possesses also the fur animals of Siberia, the ermine, the martin, the sable, the otter, which last swarms on the margins of the numerous lakes in the Kalmuk country; the marmot, the striped squirrel, and different species of hares. Even this rapid and imperfect enumeration of the principal animals of central Asia shows that nature has in some measure assembled in one corner of the world species which elsewhere exist far separated from each other. This plateau, like that of Africa, is a central region, from which several animal races may be supposed to have descended into the surrounding countries. Even in that class of animals to which their power of flying seems to have assigned the whole world for a dwelling, Central Asia seems to claim as a native the beautiful and singular bird which holds an intermediate place between the pheasant and the peacock, the *luen* of the Chinese, the *Phasianus argus* of naturalists; it is also said to be found in China and Sumatra.

We shall now enter on more particular inquiries, beginning with the country nearest to Thibet and Independent Tartary.

The country improperly called Little Bukharia extends on D'Anville's map between the 34th and 43d parallels of latitude, and between the 75th and 83d degrees of east longitude from London.[n] Major Rennel has shown that in this particular the map of D'Anville is erroneous. The western frontier may be extended to the 69th degree of longitude.[o] At least the towns of Cashgar, Yarkand, and Khoten, ought to be placed more to the west than they are by D'Anville. The letter of the Chinese general, quoted by Grosier, makes the distance between China and Cashgar nearly 280 miles[p] greater than it is in D'Anville's map of Asia.

Whatever may in that respect be the fact, eastern Bukharia, a country for a long time inhabited or governed by Tartars, and included under the name of Turkestan, must be bounded on the north and east by the Kalmuk country; on the south it comes in contact with Little Thibet, and the unknown parts of Great Thibet; on the west it is separated from Great Bukharia by the Beloot Tag, or Belur mountains, and perhaps by a high plateau called the plain of Pamer, which has been considered as the country where the Indus takes its rise.

The river of Yarkand crosses this country in an easterly course, and discharges itself into the lake Lop or Loknor, which seems to be a common receptacle for a great number of rivers. The territory seems to be plain and level in the middle, at least we hear of no mountain chain; but on the north and west it is encircled by mountains or elevated table lands. It is asserted that these contain many gold and silver mines,

[a] Aspidium Barometz. Willdenow.—P.
[b] Pallas, Nouv. Mem. sur le Nord, II. 6.
[c] Kien-Long, eloge de Moukden.
[d] Pallas, Act. Petrop. 1777.
[e] "Especе de solipède." The term *solipède* is applied by the French naturalists to quadrupeds with undivided hoofs, or to the genus *Equus*.—P.
[f] Sievers, Lettres sur la Sibérie, dans les Nouv. Mem. du Nord, VII. 214.
[g] Gmelin, Nov. Comment. Petrop. V. tab. 7. Pallas, Act. Petrop. I p. 11.
[h] Georgi, Russie, III. (vol. IX.) p. 1649.
[i] In about 50° N. lat.—P.
[k] Pallas, IV. p. 285. (4to.) Compare with Gmelin, Nov. Comm. Petrop. VII. tab. 19.
[l] Pallas, t. IV. p. 13.
[m] Guldentedt, Nov. Comm. Petrop. XX. p. 500.
[n] "Between 73° and 81° E. long. from Paris."
[o] "67° E. long. from Paris."
[p] "Nearly 100 Fr. leagues."

but neither the aborigines of the country nor the Kalmuks are acquainted with the art of working them: they content themselves with collecting the dust of these metals, brought down in abundance by the torrents which are formed by the melting of the snows, and carry it to China and Tobolsk in Siberia. Some precious stones are also found there.

According to Marco Polo, the Province of Cashgar has an extent of five days journey; it is covered with towns and castles, gardens and beautiful fields, producing good grapes, of which wine is made; there is also an abundance of fruit of other kinds. Cotton, flax, and hemp, are cultivated. The Chinese general who subdued this country in 1759,[a] writes that the soil is poor; the inhabitants covetous, and frugal in their mode of living;[b] that there are about 60,000 families, 17 cities or towns, and 1600 villages and hamlets, in the province of Hashgar or Cashgar; but perhaps he meant the whole of Bukharia, which has borne the name of the kingdom of Cashgar. The town of the same name, formerly the residence of the khans of eastern Bukharia, reckons, according to the same general, 2500 families. It is built of brick.[c]

The province of Yarkand is situated to the east of Cashgar. It is called Earcan in our edition[d] of Marco Polo; Barcan in the Treviso edition, 1590; Carchan and Carcam in others; Boorkend, Oordakend, and Ardakend, in Abulfeda, Albergendi, and other eastern writers.[e] This province is fertile in cotton and in all the necessaries of life. The people, according to M. Polo, are able artizans. But they are very generally subject to swelled legs and goitres, which are attributed to the water which they drink. Yarkand, situated on the river of the same name, is thought by some to be the present capital of Bukharia. The opinion of Petis de la Croix, who, in his learned notes on Sherefeddin, considers Yarkand as another name for Cashgar, is sufficiently refuted by the accounts of Marco Polo, and the Chinese general.

The province of Koten or Kotan lies on the south-east[f] of the former. According to M. Polo, it is eight days journey in extent; cotton, flax, hemp, wheat, vines, and other useful vegetables, are cultivated here. The inhabitants are industrious and warlike.[g] [h]

Karaia or Kereia, which is placed to the east of Kotan, is neither the Carian nor the Carit of M. Polo, which we shall find to be in the south of Thibet, and in the Birman empire. This province probably belongs to Little Bukharia. With regard to the two following provinces or countries, that point is less certain.

"On the south-east of Kotan,"[i] says M. Polo, "is situated the province of Poym;" (in some editions it is written Peym;) "it contains several towns and castles; through the capital there runs a river, which carries down precious stones, such as chalcedony and jasper. This country produces abundance of silk." D'Anville and Forster consider it as an Oasis adjoining Little Bukharia; perhaps the Thibetian term *Poy*, which denotes a province or department, might justify the conjecture that Poym is the northern part of Thibet.

All these provinces, says M. Polo, constitute part of Great Turkestan. "The first city is Ciarchian or Ciartiam. Going from Ciarchian, a journey of five days, across a sandy country, containing salt or bitter waters and some fresh, we arrive at the confines of the Great Desert, where there is a town called Iob or Lop, situated east-north-east of Poym." We see nothing in this passage to show that Ciarchian is a separate canton to the east of Poym, as the translators have concluded. It is not necessary to make first a long turn to the south-east, and then come round in a northerly direction to go south-east a second time. This would be the route which they give to M. Polo. But does he himself say that he was at Poym? We do not see that he does. Besides, the expression, first city, may designate the capital of Turkestan; now that capital was Yarkand, called also Carchan. Might not that be the place of which M. Polo speaks? According to this hypothesis, it would be necessary to bring the city of Lop nearer, to shorten the course of the river Yarkand, and enlarge the extent of the desert.

Eastern Turkestan, a country once rich and beautiful, had, in the time of Marco Polo, been ravaged by the Tartars, and was still exposed to their visits of devastation. Chalcedonies and jaspers were found in it. The inhabitants possessed flocks; every person after harvest hid his corn in a hole in the sand, in a place known only to himself, the surface being quickly smoothed over by the drifting sand of the desert. Always in dread of being robbed, they carried along with them no more than a month's provisions. Perhaps the same description will still apply to the condition of this people.

The origin and manners of the people of Little Bukharia are little known; the population, notwithstanding the admixture of some Kalmuks, is chiefly composed of native Bukharians, who are said to have tawny complexions; but many among them are handsome and well-formed. Their language, which is called Zagathayan, is nothing else than the Turkish: their idiom is mixed with a great number of Persian words.

Bentinck tells us that here as in Great Bukharia, the Tartars give the townsmen the appellation of Taujiks[k] or tributaries. These never use arms, a circumstance which makes them contemptible in the eyes of the Tartars, to whom a regular tribute is paid by every town and village of the country. They differ also from the wandering nations of the east, in not being divided into tribes. The Chinese missionaries also make a distinction between the Bukharians and the Tartars.[l] But in that instance we must probably understand by the Tartars the Kalmuks, by whom the country was conquered, and by the Bukharians the real Tartars or Turks.

[a] Grosier's account of China.

[b] Marco Polo, maravegliose cose del mondo. Edition of Melchior Sessa, Venice, 1508, cap. 38. (in the Imperial Library.) That of Treviso of 1590, greatly recommended by Pinkerton and Walkenaer, is imperfect, faulty, and insignificant, (Bibl. de Sainte-Genevieve).

[c] Cashgar is in 40° N. lat. It has four gates, and a Chinese garrison of 5000 or 6000. It is frequented by the Kirghis and Kassacks. (Moorcroft's papers.)—P.

[d] Sessa's edition.

[e] See D'Herbelot, Bibliotheque Orientale, v. Khoten and Cashgar.

[f] The traveller says, "between Gorgo and Sosolan."

[g] As to their warlike character, this passage of M. Polo is read by Ramusio and Muller so as to give the opposite meaning.

[h] Khoten is a Chinese province S.E. of Cashgar. It is a sandy country, abounding in wild asses. It contains six cities—the capital Aichi (Moorcroft's papers.)—P.

[i] "Kotun."

[k] "Tadjiks."

[l] Duhalde, IV. p. 464.

The dress of the men goes no lower than the calf of the leg: it is bound by a girdle like the Polish dress. The women wear a similar one, with long ear-rings and pendents, like the women of Thibet; their hair is equally divided into long tresses, and adorned with ribands. They dye their nails with the juice of *henné*. Both sexes wear long drawers, and short boots of Russian leather: the head dress is the same with the Turkish. The generality of the houses are of stone, and decorated with furniture of Chinese manufacture. Tea is the general beverage of the country; it is taken with milk, butter, and salt, in the manner of the other nations of central Asia. The women are purchased, and hence handsome girls are a source of wealth to their parents.

The Kalmuks may be considered as the western Mongols. Mount Bogdo gave occasion to this ancient division of the tribes. Since 1759, all the Kalmuk country has acknowledged the dominion of the Emperor of China. The Khan-Taidsha could raise 20,000 men from Little Bukharia, by taking one man out of every ten families. This gives 200,000 families, equivalent to a population of a million. The Kalmuks themselves, without reckoning the Eleuts of Koko-Nor, probably amounted to a million. Their country, which comes in contact with China on the east, and Tartary on the west, is bounded by Siberia on the north, and Thibet on the south. Its surface is equal to the whole of France, Italy, and Spain; their latitudes are the same, but in climate, productions, and manners, the difference is very wide.

We have a very imperfect knowledge of the provinces, or rather deserts and oäses, which occupy that vast extent of country.

The elevated region which D'Anville calls Kankaragay, and in which the river Irtysh takes its rise, has probably one of the most rigorous climates of the old continent. Mount Bogdo, and the other mountains in the neighbourhood, are covered with perennial snow. The Tsahan-Tala, or white plain, is one of the most elevated plains in the world, and the same thing may be said of the environs of lake Zaizan. It seems to be among the mountains of Bogdo that we must search for the Ringui-Talas[a] of Marco Polo, a country which produced steel and asbestos, and which was sixteen days' journey from the province of Hamil.

The country to which the name of Songaria properly belongs is a basin or concave plateau, bounded on the north by the mountains of Ulugh or Ulu-Tag, and on the south by the Alak chain. There is a series of lakes, the last and largest of which is the lake of Palcati or Balcash; we are told that a person can scarcely walk round it[b] in fifteen days. It is about two degrees and a half long, and more than one degree in breadth. The river Ili, augmented by a number of other streams, falls into this lake, which has no outlet.

It is on the banks of the Ili that the Songars, a tribe of Kalmuks, attracted by the exuberance of the pasture, had fixed the seat of their power; their Khan-Taidsha lived in a place called Harcash. There they kept immense droves of horses and fat-tailed sheep; their horned cattle and camels are not so numerous. The great Tamerlane, says an eastern historian, stopped on mount Ulugh to survey the immense plain which spread out at its base like a sea of verdure.[c] This country was probably the *Organum* of the traveller Rubruquis,[d] and the Irgone-Kond of Abulgazi.[e]

The mountains on the south of Songaria comprehended according to D'Anville the ancient establishments of the Oïgoors or Igoors, the ancestors of the Hungarians. As it appears that these mountains are easily passed, except at the defiles of Chongez, it is very possible that they may be only a series of plateaus of an elevation greater than that which serves as their base. Agriculture and trade formerly animated this country, which is watered by a multitude of small rivers. The civilization of the Oïgoors is as old as two centuries before the Christian era; their language was the Turkish; their letters are written from top to bottom like those of the ancient Syrians. Their alphabet, on which M. Langlès is preparing a work, seems to owe its origin to the Devanaghari, an Indian alphabet.[f] The country of the Oïgoors went also by the name of Getha; and perhaps the Getæ, who were its inhabitants, were descended from the ancient Massagetæ. This country includes likewise the canton of Turfan, situated on the declivity of the plateau of Oïgoor to the north of lake Loknor. Turfan is a considerable town, frequented by the merchants who travel between Persia and China. It is doubtless the Tarsœ or Tarso mentioned by King Haithon, and which he describes as the capital of the flourishing empire of the Iogoors.

"The empire of Tarsœ," says Haithon, in his history of the east, ch. 2, "contains three provinces, the chiefs of which are called kings. The inhabitants are called Iogoors; they abstain from drinking wine and eating animal food. They raise much wheat, but have no vines. Their towns are very pleasant, and contain many temples dedicated to the worship of idols; they cultivate the arts and sciences, but are not at all addicted to war; they have a peculiar mode of writing, which has been adopted by all their neighbours."[g]

The town of Lop, mentioned by M. Polo, was situated on the river Yarkand, a little above the place where it falls into the lake of Loknor. On the journey from Little Bukharia to China it was usual to stop here to make the necessary preparations for crossing the Great Desert.

Another road led to China, by Hami, Hamil, or Chamul, a small province surrounded on all sides by deserts. "The climate," says the missionary Duhalde,[h] "is very warm in summer. The ground produces scarcely any thing but melons and grapes; the former in particular are of excellent quality; they are preserved during winter, and are served up at the table of the Emperor of China." Other writers make this country contain agate and diamond quarries.[i] The in-

[a] Chinchin-Talas, Muller. Ringuitalas, Edit. de Venise et de Trevise. cap. 46.
[b] "Faire le tout," go round it.—P.
[c] Histoire de Timur Bey, par Scherefeddin, traduite par Petis de la Croix, liv. III. ch. 10.
[d] Forster, Decouvertes dans le Nord, p. 170.
[e] Abulgazi, Histoire générale des Tatars, liv. I. ch. 5.
[f] Langlès, Alphabet Mantcheou. p. 51—145.
[g] Haithon, Hist. Orient. c. 2.
[h] T. IV. p. 26. and 54.
[i] Grosier, Description de la Chine, p. 241, sqq.

habitants are strong and large men, well clothed and lodged, and generally profess the Mahometan faith.[a] In the time of Marco Polo they were idolaters; he describes them as good-natured and merry savages, rich in the produce of their soil, and employed much in singing and dancing. When a traveller arrives in their country, and wishes to lodge with one of them, the person on whom his choice is fixed gives up his house, wife, and family, entirely to the guest, whom he invests for the time with all the prerogatives of the master of the family, quits his house, goes through the city in quest of every thing that can contribute to the gratification and amusement of his guest, and does not re-occupy his house till the latter has left it. Manghu-Khan wished in vain to abolish the practice. The inhabitants regard it as a precept of religion, and believe that by giving it up they would incur the risk of bringing the curse of sterility on their lands.[b]

After crossing the sandy and saline plains of the great desert of Cobi, we come to the countries which formed in the twelfth century the powerful empire of Tangut, which probably extended over the north-west part of China, the country of the Sifans, and perhaps over the whole or part at least of Thibet. Marco Polo gives a detailed description of it; Kampioo, which according to him was the capital of Tangut, seems to be the Kantcheoo of the Chinese, and Singaï the modern Sigan. Five days journey to the south of Kampioo he places the country of Ergi or Ergiool, (*i. e.* the kingdom of Ergi, the termination *iool* signifying "kingdom" in the Tangut and Thibetan languages,)[c] where the musk animal, the grunting ox, and the Chinese pheasant, were seen. The moderns give Tangut the name of Kokonor or Hohonor, *i. e.* the blue lake. In the Chinese geography it is called Zinchay.[d] Satcheoo seems to be a considerable town, situated on a small stream which falls into the river Polonkir; and the latter flows toward the desert, and terminates in a lake called Hara-nor.

The boundaries of Tangut and Thibet are still wholly unknown to us. The Socor or Soocor of Marco Polo, where rhubarb grew, seems to be the Sooc of the map which the missionaries give of Thibet. Not far from this is the canton of Seri. The Bukharian merchants who brought rhubarb to Kiakta, told M. Pallas that "there was a town called Selin (perhaps Serin) situated to the south-west of lake Hoho-nor, on a river which runs into the Hoang-ho; all the country consists of high and arid mountains; rhubarb grows in the clefts of the rocks in moist places; the roots are pulled up in April and May, then cleaned and hung on trees."[e]

The country inhabited by the Sifans, who speak the Thibetan language, is situated in the corner in which China, Tangut, and Thibet meet.[f] It receives the name of Tosan, and was once a powerful empire, but fell to pieces in the ninth century of our era. The black Sifans, who live on the Hoang-ho or Hara-Moren, (the black river,) are less civilized than the yellow Sifans, who live on the banks of the Yan-tse-kiang, or yellow river.[g] The horses of this country are small, but valued for their strength and other excellent qualities. Gold is found in the beds of the rivers.

The Kalmuks, who under the sovereignty of China rule the country now described, or at least the greater part of it, do not differ materially from the Mongols. They completely exemplify the portrait which Procopius, Ammianus, Priscus, and Iornandes, have drawn of the celebrated Huns. They are generally of a middling height, and more of them under than above the ordinary stature. Left to nature from their infancy, their bodies are universally well made, and their limbs free. The characteristic features of the Kalmuk countenance are the following: The angle of the eye is directed obliquely downward to the nose, the eye-brows black and thin, the interior ends of the arches which they form are low, the nose is flat and broad towards the forehead, the cheek bones prominent, the head and face very round. Perhaps the way in which their caps are fitted close to the head makes their ears appear more prominent than they would otherwise do, but they are naturally large in proportion. Their teeth preserve their beauty and whiteness to the most advanced age. Their skin, naturally white, assumes a brownish yellow by exposure to the solar rays in summer, and to the smoke of their cabins in winter. This differs in degree in different individuals and in the two sexes. Many of the Kalmuk women have a handsome figure and a white complexion, the effect of which is increased by their fine black hair.[h] The acuteness of the senses of smell hearing, and sight, among the Kalmuks, surpasses all the ideas that a European can form. They perceive by the smell the smoke of a camp, hear the step of a horse, and distinguish the most minute object in their immense plains, at an astonishing distance.

The Kalmuks call themselves Derben Oercet, "the Four Brothers or Allies." The four nations thus called are the Choshots, called Sifans by the Chinese, consisting of 50,000 families, and occupying the neighbourhood of lake Hoho-nor; the Songars, in the country which bears their name, and who, though once very powerful, are reduced to 20 or 30,000 families; the Torgots, who after having lived in Russia in the steppe of Astrakan, amounting to 60 or 70,000 persons, returned in 1770 to their original country; lastly, the Derbets, some of whom have joined the Torgots, and others the Songars. In addition to these nomade tribes, it appears that the towns are inhabited by Bukharians, Chinese, and perhaps stationary Kalmuks.[i]

[a] The language was formerly Turkish. (Moorcroft's papers.)—P.
[b] Marco Polo, ch. 45.
[c] Mithridates, I. 72.
[d] Extract from the Dai-syn-y-tundschi, in Busching's Geogr. Magazin. XIV. 554.
[e] Pallas, Voyages en Russie, IV. 216, (trad. in 4to.)
[f] Regis, in Duhalde, IV. p. 463.
[g] The Hoang-ho is the *yellow river*, and the Yan-tse-kiang the *blue river*, according to the general statement of geographers, including Malte-Brun himself, in the article China, p. 399.
[h] Pallas, Voyages, I. p. 491.
[i] The original name of the Kalmuks was Oïrote. They at first lived on the Goang; under Genghis Khan they lived on the Ili, and were called Dsjungars or Soongors. After his death, they were engaged in almost constant civil wars, between their princes or Taïshas. In 1620 two of their Taïshas (Loasang and Elding) advanced to the Ural, with the Torgots, the Derbets, and a part of the Choshots. (The other part of the Choshots retired to the banks of the Ienesei, where their descendants are called Buriats.) Soon afterwards they advanced to the Wolga, and subjected 40,000 Nogais. They were then engaged in frequent civil wars, and in a war with Russia, in which they were signally defeated in 1643, and submitted to that empire. In 1702 they advanced

The Kalmuks are fond of society and entertainments. They cannot bear to eat by themselves; their greatest enjoyment is to share their provisions with their friends. The dress of the men resembles that of the Poles, with the exception of the sleeves, which are very tight and buttoned at the wrist. The common people are clothed in sheep skins and felt. In summer the girls go with the breast bare down to the girdle. The men shave their heads, leaving only a small tuft of hair; the women, on the contrary, are very tenacious of that article of attraction; their hair hangs loose till the age of twelve, when they are considered marriageable; then they collect it in braids surrounding the head; when married, they allow it to hang in two divisions over the shoulders.

The dwellings of the Kalmuks are tents, or rather a sort of half cabins or wigwams of hurdles, in a circular form, covered with a roof of felt, which is proof against rain and snow.

The Kalmuks prefer the freedom of their nomadic state, and their portable dwellings, to all the conveniences of a settled life. Hunting, the care of the flocks, and the building of tents, are considered as the only occupations suited to the dignity of a free son of the desert. Domestic labours fall to the share of the women. They also pitch and strike the tents, saddle and bring out the horses; hours of leisure are as rare with them as they are frequent with the men. The Chinese endeavour to give the Kalmuks agricultural habits; in this they will not easily succeed, as the rude climate and arid soil either banish rural culture from the greater part of their country, or render its produce precarious.

Mare's milk is preferred by almost all the people of Asia to that of the cow. This milk, in its recent state, is more fluid than cow's milk, but it has a slight alkaline taste, which makes it offensive to Europeans. When allowed to stand for a sufficient time in clean vessels, it acquires an acid, vinous, and very agreeable taste; and a few drops of cream can with difficulty be obtained from it. The Kalmuks make from the milk a slightly spirituous drink, which they call *araka*, and not *koumis*, as is commonly said: koumis is the Tartar, not the Kalmuk term for the milk of the mare.[a]

Their food consists almost entirely of articles of the dairy, and the flesh of animals, generally what they take in hunting, for they seldom kill their domestic animals.

The felt with which their tents are covered is of their own manufacture. The women have uncommon skill in preparing the skins of animals, and making from them utensils of all kinds. The men manufacture some of their arms.

The language of the Kalmuks is the same with that of the Mongols, and totally different from the Tartar, both in words and in syntax. Many of the Hunnic proper names may be still traced in it.[b] The frequency of monosyllables reminds us of the Thibetan and Chinese languages.[c] Deprived of articles, scarcely admitting the aid of pronouns, or the elegant effects of conjunctions, and giving few inflections to the verb, it appears one of the poorest, but also one of the most ancient languages in the world. It is said to be sonorous, harmonious, and poetical.[d] The affecting romances and epic poems of this people partake of the sombre and magnificent nature of their country. The rocks, the torrents, and the meteors of Ossian, figure here, along with legends of miracles not less wild and absurd than those of the Hindoos. Yet they contain features of sublime truth with which persons of all nations, whatever may be their factitious habits, must be pleased.[e] The romantic story of one of their fugitive tribes begins thus: "The waters of the vast lake, after exhausting all their stormy fury, subside into a calm. Such are the troubles of this world, and their tranquil oblivion." These nomades have poems of twenty cantos and upwards, preserved by tradition alone. Their bards or *djangartchi* recite them from memory, surrounded by attentive and enraptured audiences.[f] Besides the Mongolic alphabet, which consists of forty-four letters joined perpendicularly, the Kalmuks have an Indian character called the *onetkak*, which they employ in their magical incantations.

The ignorant arrogance of Europeans regards the free people of Asia as savages without laws or manners; but the khanats of Asia are at least equally respectable with our feudal governments of the middle age. The Kalmuks have three distinct classes in society; the nobility, who are called "white bones;" the common people, consisting of slaves, who are denominated "black bones;" and the clergy, who are descended from both of these casts, and consist of free men. The noble ladies are called "white flesh," and the women of the lower orders "black flesh." The genealogy is always reckoned by the male connexions, or "the bones." The power of the Khan-Taïdsha, or head prince, must be estimated only by the number and importance of his subjects, and not at all by the extent of his territory, which in that vast country is of little value. The subjects of each chief form an *ooloos*,[g] which is divided into *imaks*, consisting of from 150 to 300 families; each imak is commanded by a Saïssan or nobleman. When they have a great khan, the princes submit to his direction only in matters of general concern. The tribute consists of a tenth part of the flocks and other property. All the men are obliged to appear on horseback before the prince on the first summons when he has occasion for military service, and he dismisses those who are unqua-

to the Don, where lands were assigned them by Peter the Great, and where they were enrolled with the Don Cossacks. In 1770—71 many of them, disgusted with Russia, retired over the Ural into the Chinese territories. Owing to disputes with the Cossacks, the greater part of those on the Don retired (1802) into the government of Astrakhan, where lands had been assigned them.—P.

[a] Pallas, Voyages, I. 501.

[b] Such as *Munzak*, *Athel*, *Denzik*, *Emedzar*, *Uti*, &c. See B. Bergmann's nomadische Streifereien unter den Kalmuken, I. p. 125.

[c] Vocab. Petrop. No. 137. Falh, Mém. Topogr. III. 575, (in German.) Fischer's History of Siberia, introd. p. 40, (in German.)

[d] The following is a passage from a heroic romance in the Kalmuk language:

Tushimail aïn kaimain aboodal inoo go tælghym ssaid-kill inoo
Minister thus spoken countenance but elevated prophet mind but
æmoogolangtuï baiyai oosaisskylaintai gaigain inoo toonggoolak...Bi
tranquil body imposing visage but serene. I
niggai sobylongtoo kækshin joockai noossatoo mæn.
a suffering old man very aged truly.

Translation. The minister thus spoke: thy noble countenance announces a prophet; thy mind is tranquil; thine exterior commanding; thy look serene. I am an old man, suffering and oppressed with age. See Bergmann, in the work already referred to, I. 114.

[e] Kalmuk Romances, in Pallas's Memoirs on the Mongolian Nations, I. p. 153, (in German.)

[f] Bergmann, II. 206, 236, &c.

[g] "Oluss."

lified for the fatigues of war. They are armed with bows, lances, sabres, and sometimes fire-arms; but the latter are chiefly confined to men of rank. The rich warriors wear a coat of mail formed of rings, or that kind called chain armour, such as was used in Europe in the fifteenth century.

The religion of the Kalmuks, in common with all the Mongolian, Mantchoorian, and Thibetan nations, is that of the Dalaï Lama. This sovereign priest is chosen from the yellow Sifans, whom Pallas considers as a Kalmuk tribe. In our description of Thibet we shall give a view of this system. We may only observe, that of all nations they are most completely in subjection to the dominion of priests, to whom they commit the direction of all their affairs; nothing is done without consulting a *gellong* or juggler, who pretends to interrogate the gods by means of sorceries. These *gellongs* levy a handsome tribute on their credulous flocks; they live in luxury; celibacy is enjoined on them, but considerable licences are considered as their right, particularly in the houses of those who shew them hospitality in the course of their frequent peregrinations.[a]

When we pass Mount Bogdo, we enter the country of the true Mongols. The middle of this region is a cold and barren table land; it forms the termination of the desert of Shamo or Cobi, which is about 1400 miles[b] long, and the western and southern extremities of which extend to Thibet and Little Bukharia. The countries of Hamil, Lop, and other fertile Oäses, afford short interruptions to its frightful uniformity. There are meadows along the banks of the rivers where the small Mongolian horses wander in large droves, and the wild djiggetai comes to take his rapid meal in the pasture.

The countries in the neighbourhood of the great wall of China have a climate similar to that of Germany. The prevalent soil is of a clayey texture. At Zhe-holl, on the confines of Mongolia, in lat. 41° 58′, the English accompanying Lord Macartney saw aspens, elms, hazel and walnut trees; but on the mountains the pines were small, and the oaks stunted.[c] The Yellow or Sharra Mongols wander in this country, while the Kalkas, or Black Mongols, occupy the region lying north of the great desert. This last country, adjoining Siberia, is very little known. As, according to the accounts given by Pallas, Sokolof, and Patrin, Russian Dauria is subjected to powerful summer heats, and the lower mountains are covered with beautiful forests of pines, birches, elms and poplars, while the plains support numerous flocks, and may be cultivated with several sorts of grain, it was natural to infer that Chinese Dauria, and some other parts of the north of Mongolia, resemble it in climate and productions. The journey of the last Russian embassy being begun in the middle of winter, and stopping at a distance of about 200 miles[d] from the frontier, we only know that the country contains arid plains and steep mountains, many of them wooded, and abounding in wild boars, deer, and elks.[e] There is a mountain here held in peculiar veneration, called Khan-Ola, or the "Royal Mountain," on which there are several temples and sepulchres. It is thought that the principal tin mines of the Chinese are in this country. It is ascertained that the Chinese have a very profitable establishment of iron works near lake Iroi, about forty miles[f] from Kiakta.

The Hoangho traverses part of southern Mongolia About the middle, and farther to the east, there are many small rivers which are lost in the sands. In the north the Selinga and the Orchon carry their waters to lake Baïkal, while the Kerlon and the Onon join to form the magnificent river Amur, which flows through the territory of the Mantchoos.

At the base of the Bogdo mountains we find the great lake Kosogol, and some others of considerable extent. Marco Polo has left us a description of the lake Cianga, which seems to be identical with that of Tsahan, or the Tsahan-Nor. On the banks of this lake the great khan had a country seat; it abounded with swans, argus-pheasants,[g] cranes, partridges, and quails; but the cold being severe, the khan visited it only in summer.[h]

It has been thought by several authors that this country was once filled with large cities; but it is much more probable that the Mongols have never been sufficiently numerous, nor sufficiently rich and industrious, to build cities worthy of the name. Even the famous Karakorum, the Ho-lin of the Chinese, the seat of the great Mongolian empire, was built of earth and wood. Perhaps it was a summer residence, like the present Zheholl, where the emperor of China received the British ambassador Lord Macartney. Zhe-holl contains a spacious Chinese palace, extensive and magnificent gardens, some pagodas or temples, and a crowd of wretched huts. If deserted, the whole would disappear in less than a century. It is matter of no surprise that we search in vain for any vestiges of Karakorum. According to D'Anville, it was situated on the Engui-Moren, about the 44th degree of latitude, and 106th[i] of longitude (from London;) but according to Fischer,[k] on the banks of the Orchon, at 103°[l] of longitude and 47° of latitude. The princes and chief priests of the Kalkas-Mongols lived not many years ago in a camp called the Urga, about 220 miles[m] from Kiakta, on the river Tula; this camp has been converted into a town, and called Kyræ.[n] The temples, the houses of the priests, and the house of the Chinese viceroy, are the only wooden edifices; the rest consist of tents.

Maimatschin, a small town on the very frontier of Russia, is the seat of the trade with Kiakta. Naoon is a mercantile town, at the distance of a month's journey in a south-east direction from the Russian post of Zooroochaitu, on the river Argun; the merchants of that place come to this post armed with bows and arrows, and bring with them stuffs of very good quality. Their language is neither Chinese nor Mongolic.[o]

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[a] "Le célibat leur est prescrit; mais quand ils voyagent, ils ont le droit de partager le lit de leurs hôtesses, et ils voyagent souvent."
[b] "More than 500 Fr. leagues."
[c] Macartney's Embassy.
[d] "300 versts, or about 70 Fr. leagues."
[e] Account of the Russian Embassy. Ephém. Géogr. XXI. p. 225.
[f] "50 versts."
[g] *Phasianus Argus.*

[h] Marco Polo de Reb. Orient. I. cap. 64. Forster, Découvertes dans le Nord, I. p. 230.
[i] "104° from Paris;" 106° 20′ 15″ from London.—P.
[k] Introduction to the History of Siberia, (in German.)
[l] "101° from Paris."
[m] "300 versts."
[n] Ephém. Géogr. XXI. 230. Bruns, Aussereuropæische Geogr. I. 69.
[o] Sokolof, dans Pallas, Voyage, IV. p. 620. 4to.

The Mongols, like the Kalmuks, have flat faces, small oblique eyes, thick lips, short chins, and scanty beards; their ears are large and prominent; their black hair adds to the effect of their reddish-brown or yellow complexions. But more civilized, in consequence of their former residence in China, they are more tractable, more hospitable, and more addicted to pleasure. The Russians of Dauria consider the Mongolian women as more fertile than their own. These women are also industrious and cheerful. The religious books of the Mongolians are written in the languge of Tangut or Thibet, and every imak has a schoolmaster. The lamas or priests, and their heads, the *khutuctu*, enjoy great consideration, and are under the authority of the great Dalaï Lama.

Polygamy, though allowed, is uncommon. They marry very young, and the women bring to their husbands a portion in cattle or in sheep. They light their fires in the middle of their tents; and in the deserts cow-dung is used as fuel. The tents of the nobility are hung with silk stuffs in the inside, and the floors covered with Persian carpets. Tin, silver, and porcelain vessels, are used in the houses of the great. The tents of the common people are made of a kind of felt. In some places they erect small temples, round which wooden huts for the priests are built.

They shave their heads, leaving only one ringlet, and cover them with a flat-shaped yellow cap. This at least is the case among the Sharra Mongols. They wear wide pantaloons, a light vest with tight sleeves, and a girdle in which they stick the sabre, the knife, and smoking apparatus. Their outer garment is of woollen cloth, with wide sleeves; their feet are wrapped in linen, over which they wear leather boots, which are generally either black or yellow. They are not yet so far advanced in luxury as to use shirts. The Mongols live on animal food, which they sometimes eat with vegetables; water is their ordinary drink; they regale themselves with butter-milk, and koumiss; they have also become acquainted with the use of spirits, of mead, and still more of tea. Their flocks consist of horses, camels, black cattle, sheep, and goats. The women tan leather, dig the esculent roots, cure the winter provisions by salting or drying, and distil the koumiss, or spirit of mare's milk. The men hunt the animals which wander in great numbers over the vast deserts.

When the Mongols travel, they dress a whole sheep in its own skin; they take off the skin, and convert it into a kind of bag, which they fill with water, along with the flesh stripped from the bones, and throw into it, one after another, a number of stones red hot. The meat is thus completely cooked, and the broth is excellent.[a]

When the pasture begins to fail, all the tribes strike their tents, which takes place from ten to fifteen times in a year. In summer their progress is northward, and in winter southward. The flocks, the men, the women, and the children, form a regular procession, followed by the young women, singing cheerful songs. The amusements of these wandering and happy tribes are horse races, in which even the young women excel, archery, wrestling, pantomime, singing performed by young women, and generally accompanied by the viol and the flute. The subjects of these songs are love adventures; they are full of the gigantic and wonderful; the melody is harsh and disagreeable. Chess is a favourite game among them. The bodies of the princes and chief priests are burned with great solemnity, and their tombs are generally encircled with walls, and ornamented with very high poles, on which strange looking flags are fixed.

We do not know whether the Mongols still retain a superstitious but affecting custom described as prevalent among them in the time of Marco Polo.[b] When two families lost at the same time favourite children of different sexes, they made between their manes what they called marriages of the dead; these alliances were celebrated at the graves of the children with much solemnity; and the respective relations afterwards conducted themselves to one another as persons united by the ties of blood.

The Mongols, though less addicted to superstition than the Kalmuks, have more external appearances of religious worship. They build temples, some of which are of stone. Books are more common among them than among the Kalmuks. They have, in addition to their ordinary writing, a kind of short-hand called *akshar*, derived from Tangut. Their common alphabet contains 98 characters, some of which represent whole syllables.[c] This alphabet seems to be in a great measure borrowed from that of the Oïgoors. The Mongolic language, which is little known, is the same as that of the Kalmuks already described.

The khans of southern Mongolia are entirely subject to China, pay an annual tribute, and present themselves at the emperor's court in the posture of the humblest vassals. But no tribute seems to be exacted of the khans of the Kalkas. They receive, on the contrary, a small salary from the emperor, which is no doubt as an acknowledgment for their station as a garrison to protect the Russian frontier. To complete the view of the imperfect but remarkable civilization of the Mongols, it must be stated that, since 1620, they have been in possession of a complete code of laws, subscribed by forty-four princes and chiefs. In these the greater part of crimes are punished by fines, and actions of public utility are rewarded. He who refuses milk to a traveller is fined a sheep. The evidence of the ordeal is admitted, likewise solemn oaths from a superior warranting the innocence of an inferior; institutions coinciding with those which existed in Europe during the middle ages.

[a] Iæhrig, in the selection of Memoirs of the Economical Society of Petersburgh, III. 341, (in German.)
Marco Polo de Reb. Orient. I. cap. 58.

[c] Bayer, Elem. litter. Mongol., in Comment. Petrop. III. 180. IV 289.

BOOK XL.

MANTCHOORIA AND COREA.

The central zone of Asia ends with Mongolia and the Siolki chain of mountains. The rivers no longer flow along an elevated plain. The ground inclines to the sea of Okhotsk on the one side, and the Yellow Sea on the other. The plants and the trees of temperate climates begin again to appear; but to the east a high chain of mountains, parallel to the shores of the sea of Corea, is continued through the peninsula of that name, and by its elevation and its extensive forests counteracts the favourable influence of the solar heat. Though under the same latitudes with France and Italy, these mountains have very long and rigorous winters; but the central parts, which are watered by the river Amur, enjoy undoubtedly a milder climate. If the agriculture of these parts is deficient, the fault must be ascribed to the indolence and ignorance of the inhabitants. The territory situated on the Yellow Sea, or the province of Leaotong, seems to enjoy a climate resembling that of Germany and the north of France.

The mountains surrounding Zhe-holl are not very high.[a] They present no regular chain, but rather an undulating surface, and are composed of indurated clay mixed with gravel.[b] Perhaps the high chain of mountains along the shore of the sea of Tartary is completely detached from the central chains of Asia. In the north, the Stanovoi mountains send several branches to the banks of the river Amur; but we know nothing of their nature. On all that coast there is frost and snow in the middle of September.

The Chinese geographers tell us that the river Amur rises in the mountain of Kente in Mongolia. At first it is called the Onon; after receiving the Ingada near Nertchinsk, it takes the name of the Amur.[c] The Russians call this united stream the Shilka; it is after the Shilka is joined by the Kerlon that they call it the Amur. The length and size of the Shilka and Kerlon appear to be nearly equal. The Amur, called Seghalien-Ula[d] by the Mantchoos and Tungooses, receives from the south two great rivers, the Songari-Ula, in Chinese *Chuntungian*, and the Usuri or Usuli. It falls into the sea of Okhotsk, forming a large gulf bounded on the east by the shores of Seghalien island, and communicating on the south with the sea of Corea, or the channel of Tartary, by a narrow opening, the mouth of which is in some measure concealed by aquatic plants. Deep and still, it presents no impediment to navigation; it has neither rocks nor shallows; its banks are lined with magnificent forests.[e] The Russians complain greatly of the perfidy of the Chinese, who by force and surprise, obliged the Russian plenipotentiaries, in 1689, to make a formal cession of the lower part of that fine river, which was indispensable to the masters of eastern Siberia, and on which the Cossacks had already fixed the standard of Russia.

Mantchooria, so confusedly described in our geographical works, is clearly enough delineated in those of the Chinese. The whole country forms the government of Shengyn or Shin-Yang, divided into two *fous* or sub-governments; that of Fyntien or Leao-Tong in the south, on the Yellow Sea; and that of Mantchoo on the Amur and the sea of Corea.

The province of Leao-Tong is described in the following manner by the Emperor Kien-Long in the "Eloge of Mookden," (of which we have a French translation executed by Amyot,) a feeble and frigid production as a poem, but very useful to the geographer. "In a space of 10,000 *ly* we find a succession of hills and valleys, parched lands, and others which are well watered, majestic rivers, impetuous torrents, graceful serpentine streams, smiling plains, and forests which are impenetrable to the solar rays. The Iron Mountain and the Ornamented Mountain[f] are seen from a great distance. On the latter is found a lake which never increases nor diminishes." The imperial poet mentions among the trees of this country the fir, the cypress, the acacia, the willow, the apricot, the peach, and the mulberry. Wheat yields a return of a hundred fold. Southernwood and mugwort would cover all the fields, but, from the general cultivation, are found only in the deserts. Ginseng[g] grows in all the mountains; its name signifies "Queen of Plants." "It would make man immortal if he were capable of becoming so." Among animals, Kien-Long mentions the tiger as in no degree formidable, which is perhaps the lion without a mane figured in Nieuhoff;[h] the leopard, by which he undoubtedly means a species of the ounce; the dchighetei,[i] the wild horse, two species of ounces, the civet, and the sable. The dogs rarely bark during the day; they seem to be of the Siberian race. The pheasant is conspicuous among the numberless birds with which the fields, the forests, and the banks of the rivers and lakes, together with the sea-shores, are peopled. The sturgeon, the king of fishes, the carp, the eel, and other excellent species, form the food of entire tribes.

[a] Staunton's account of the Chinese Embassy.
[b] Pudding-stone.—P.
[c] *Dai-syn-y-tundschi*, the Chinese Geography, in 24 vols. translated (in the form of an abridgment or series of extracts) into Russian by M. Leontiew, and into German by M. Hase, in Busching's Geograph. Mag. XIV. p. 462.
[d] The Russians make it Saghalyn, but the natives, according to La Perouse, pronounce it Seghalien.
[e] See Muller's Memoir on the river Amur, composed by order of the Russian government in 1740, in Busching's Géogr. Mag. II. 507. See also the History of the Country on the Amur in the Collections in illustration of the history of Russia, II. 289, (in German.)
[f] Mont Brodé; literally, the Embroidered Mountain.
[g] In Mantchoo, *Orhota*.
[h] See the account of China, Book XLII.
[i] *Djiggetai*.

The mother-of-pearl of this country is of admirable quality. To these riches are to be added iron and jasper.[a]

Mookden, in Chinese Shin-Yang, was the residence of the last sovereigns or *shwandis* of the Mantchoos, immediately before the conquest of China. It contains several temples, and one in particular where the monarch prays alone on the first day of the year. The town is surrounded by two walls, the outer one being leven miles[b] in circumference. Leao-Yang is also a considerable town.

The province of Mantchoo, which produces copper, iron, jasper, pearls, and furs, contains a middling sized town of the same name. Yenden, in Chinese Sin-Tchin, is the ancient residence of the Mantchoo princes, to whose memory magnificent monuments have been raised by their successors. The precise situation of that town is not known. Ooanlin, the largest town of the country, Ningoota, the capital of a military government, Tzitchakar, Merghen, and Seghalien-Ula, are marked as small fortresses on the map of D'Anville.

The general denomination of *Yupi* is given to the nomade fishermen; such are all the inhabitants of the eastern coast, a poor, but good-hearted and simple race, who were visited at a few places by the unfortunate La Perouse. One tribe of them, called the *Ghiliaiky*, lives on either bank of the Amur or Seghalien near its mouth. The tribe of the Natki or Atchani begins higher up the river, by about fourteen days sailing. Both tribes are dressed in fish skins during summer. The Natki use dogs for drawing their carts. The Ghiliaikes are said to employ tamed bears for a similar purpose.[c]

To La Perouse the eastern coast appeared to be almost a desert. On every hand a luxuriant vegetation reminded the mariners of their dear native country, which they were never more to behold. The lofty mountains were adorned with the spreading branches of the oak, and the verdant pyramidal forms of the pine. In the lower grounds, the willows drank the moisture of the rivers. The birches, the maples, and the medlar trees, rustled in the winds. The lily, the rose, and the convallaria, perfumed the meadows. The spring was that of Europe, the flora nearly that of France. But there was no trace of the slightest commencement of cultivation; no proof that these fine shores had ever been inhabited by human beings; no paths but those of the bear and the stag were formed across the rank herbage, often four feet in height. A grave, and some fishing utensils, seemed to indicate that some wandering tribes came occasionally from the interior to give a momentary disturbance to the fishes which swarmed at the mouths of the rivers.[d] It is strange to find a country so highly susceptible of culture in the state of an absolute desert at the very gates of the ancient Empire of China, in which the exuberance of the population, often proves the cause of famine in all its horrors.

The sea of Japan brings to these shores immense floating meadows of marine plants, so that the anxious mariner often apprehends that his vessel is entangled by a new land, seeming to rise up from the waters which it conceals from view. In the extensive fogs which beset these countries, an optical illusion often presents the appearance of elevated and extended shores: the seaman draws near them and thinks of landing, when the fairy scene suddenly dissolves in vapour and disappears.

The whole of Mantchooria, according to the Chinese geography, contains no more than 47,124 tributary peasants, but the aboriginal people are not included in this number, which probably consists of colonists from China. The country furnishes 10,000 Mantchoo soldiers.

The Mantchoos belong to the great race called Tungooses by the Russians and Tartars, and *Oven* in their own language.[e] The Daurians are Mantchoos, but mixed with Mongols. Several tribes, such as the Dutcheri on the banks of the Amur about the middle of its course, the Solons on the Argun, and others, seem to differ only in slight shades of civilization. The Mantchoos, under the name of *Nieutché*, before the twelfth century, subjugated the Leaos or Khitans, to whom they had previously been vassals, and who inhabited the province of Mookden; in 1115, they invaded the north of China, where their princes founded the dynasty of *Kin*, which means gold.[f] Dispossessed by the Mongols, they returned to their wild mountains, whence they issued afresh in 1640 under the name of Mantchoos, to make the conquest of the whole of China, which still yields them an obedience mingled with hatred, and interrupted by partial rebellions.

The Mantchoos were acquainted with agriculture, and even had a code of laws, before they conquered China. That extension of power has injured their native country, as the leading families have emigrated to China.

According to the accounts of the Jesuits, the Mantchoos have neither temples nor idols; they worship one Supreme Being, whom they style the emperor of heaven. Yet the religion of the Mantchoos who are settled in China has an affinity with the system of shamanism. Of the three great nations of central Asia, the Mantchoos may be considered as the most advanced in civilization, particularly since they have conquered China. And their progress in this respect must of late have been still greater, as the last emperor ordered the best Chinese books to be translated into the language of the Mantchoos. These people are more robust in their figure, but have less expressive countenances than the Chinese. Their women have not, like those of the latter, their feet cramped and distorted; their head dress consists of natural and artificial flowers. Their general dress is the same with that of the Chinese.

The Mantchoo, Mongolic, and Tartar languages differ radically from one another. M. Langlès, who has published a Mantchoo dictionary, asserts, that it is the most perfect and learned of the Tartar idioms,

[a] *Dai-syn-y-tundschi*, Busching, Mag. Géog. XIV. 429.
[b] "More than 4 Fr. leagues."
[c] The Cossacks Payarkow and Shabarow, quoted by Muller in the work already referred to, p. 504, 505.
[d] La Perouse, Voyage autour du Monde, III. 12, 15, 16, etc.

[e] Pallas, Memoirs on the Mongolian Nations, I. p. 2. (in German.) Georgi, Description des Nations Russes, p. 302. Langlès, Alphabet Mantchou, p. 41.
[f] Langlès, Alphabet Mantchou, p. 30, 36, 40, &c

without excepting that of Thibet, though it did not appear in a written form before the seventeenth century. At that period, the Mantchoo monarch ordered men of learning to write out a set of letters similar to those of the Mongols. The alphabet of the Mantchoos contains fifteen hundred groups of syllables, which M. Langlès has attempted to reduce to twenty-nine letters, the greater part of which have three different forms, as adapted to the beginning, the middle, and the end of a word.

We shall not dwell on the frequency of *onomatopœias*, or words imitating natural sounds; nor on the extreme softness of the language, which never admits of two consonants without an intermediate vowel; nor its copiousness in particles capable of being joined to words to modify their meaning; nor on the great number of inflections given to the verb as in the Hebrew and Arabic. The consideration of these characteristics belongs properly to the philologist. But we must not pass over in silence a fact which seems connected with the ancient migrations of mankind. The Mantchoo language, though it belongs to the eastern extremity of the old continent, of which we inhabit the western extremity, has many radical sounds bearing a close affinity to those of the languages of Europe.[a] These do not consist of terms of art, which might have been brought by German prisoners of war carried to Asia by the Mongols, nor of words borrowed from natural sounds connected with the objects which they denote, and thus derived from a source common to all mankind. The resemblance, besides, only extends to the Gothic-German and Latin-Greek languages, which, as we have observed, have also affinities with the Sanscrit. Nothing in the Mantchoo language has the appearance of being Celtic or Sclavonian. There is only one feature which reminds us of the Sarmatian or Lithuanian,[b] but this feature is also common to the Indo-Germanic languages. These roots, common to languages locally separated by half the circumference of the globe, seem to indicate that the Mantchoos belonged originally to the neighbourhood of Persia and of India.

Between the islands of Japan and Mantchooria is the great peninsula of Corea, washed by the Sea of Japan on the east, and on the west by the Yellow Sea or Gulph of Pekin. This country is about 640 miles[c] in length; but one third of this length does not belong to what properly forms the peninsula. Its breadth, at its northern and its southern end, is from 250 to 280 miles;[d] but at the place where the peninsula properly begins, the width does not exceed 140.[e] Corea is nearly as extensive as Italy.

The only well known feature of the physical geography of Corea is the existence of a high chain of mountains in a direction from north to south, and which seems to have a connexion with the mountains of Mantchooria. This long chain, when it enters the peninsula, runs parallel to the shore of the Japanese Sea, at a very short distance. The most easterly province has the name of Kiang-yuen, or "the Country of Springs." The general inclination of the land is to the Yellow Sea. The coasts and adjoining islands are rocky and difficult of access. Two large rivers are known in this country, the Ya-loo and the Tu-men. The first discharges itself into the Western Sea; the second into the Eastern. Both are in the northern parts of Corea, and beyond its peninsular part. They take their rise in the same mountain, which is very high, and is called by the Chinese *Shang-Pechan*, and by the Mantchoos, *Shen-Alia*, or "the Mountain of Perpetual Whiteness."

It is said that Corea, though in the latitude of Italy, has a very cold climate, from the mountains which it contains. We are told that in the northern parts, snow falls in so large quantities as to render it necessary to dig passages under it in order to go from one house to another. Yet the soil is fertile and well cultivated. Among its mineral treasures are gold, silver, lead, iron, topazes,[e] and rock salt. The most common animals, according to Father Regis, are wild boars, bears, sables, (in the northern parts,) martens, beavers, and deer. The rivers abound in fish, and, according to Hamel, who says he lived nine years in the country, *kaïmans*,[f] a kind of crocodiles, are found here, some of which are thirty or forty feet in length. The missionaries also heard of fowls with remarkably long tails, which undoubtedly were a species of pheasants. There are poneys only three feet high.

The mountains of the north are covered with vast forests: their only other produce is barley and ginseng, the root of which last is so precious in the eyes of the Chinese. The southern provinces abound in rice, millet, and a species of *panicum* from which a vinous liquor is made; in hemp, tobacco, lemons, and silk. A tree of the palm kind produces a gum which, when used as an ingredient in varnish, gives it the appearance of gilding.

The true names of Corea are *Kao-li* and *Tchao-sien*; the former is its ancient name, and still used in com-

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[a] The following may be taken as a specimen:

Mantchoo terms.	*European terms.*
Hife, oats	*Avoine*, (French.) *avena*, (Latin.) *hafer*, (German.)
Morin, a horse	*Mœhre*, (German.) *mare*, (English.)
Fara, a sledge	*Fahren*, to ride in a carriage, (German.)
Tchop, top of a mountain	*Schopf*, a summit (in German.)
Oura, the back part or rear	ουρα, the tail, (Greek.)
Kaka	*Cacare*, (Latin.) *caca*, (French.)
Sengui, blood	*Sanguis*, (Latin.) *sang*, (French.)
Ania, a year	*Annus*, (Latin.) *an*, (French.)
Fahala, blackish	*Fahl*, (German.)
Fialhu, indolent	*Faul*, (German.)
Furu, mad	*Furor*, (Latin.) *fureur*, (French.)
Lapta, torn	*Lappen*, (German.)
Leta	*Tard*, (French.) *late*, (English.)

See Adelung's Mithridates, I. 516.

Mantchoo terms.	*European terms.*
Ama, father	*Amme*, (Dan.) nurse; *ohm*, (Germ.) uncle.
Na, earth	*Ned*, (Dan.) below.
Tatchi, learn / *Tatchi-bume*, to teach	*Teach*, (English.)
Endori, spirit	ενδο, (Greek) within; *entrailles*, (French.)
Ambaki, greatness / *Amban*, great lord	*Ambath*, *Ambathman*, (Frank & Icelandic.) ambassador.
Scha, look	*Schau*, (German.)
Sa, know	*Sache*, (French.)—Malte-Brun.

[b] The syllable *bu*, the auxiliary by which the passive voice is formed in Mantchoo, is the *buwi*, "I was" ("*Je fus*") of the Sarmate-Lithuanians, the *be* of the English, the *bin* of the Germans, and the *fui* of the Latins.

[c] "230 French leagues."

[d] "90 to 100 French leagues"

[e] "48 to 50 French leagues."

[f] Dai-syn-y-tundschi, in Busching, Mag. Géog. XIV. p. 534.

mon language, the latter its modern appellation, and adopted in the official style. Both of them are derived from the names of dynasties which have reigned in the country.[a]

It is divided into eight provinces; King-ki in the centre; Ping-ngan, Hoang-hai, and Tchu-sin, on the western shore; Tsuen-lo, in the south; Kin-han, Kiang-yuen, and Hien-king, on the Eastern Sea.

The Corean towns have the same general appearance with those of China. But the houses are built of mud, without art, and destitute of convenience; in some places they are raised on stakes. The houses of the nobility have more external show, and are surrounded with extensive gardens. King-ki-tao, in the province of King-ki, is the capital and royal residence. The great wall which the Coreans had built as a bulwark against the inroads of the Mantchoos is now falling to ruin. The coast of Corea was found by the Alceste and the Lyra[b] to be every where surrounded with numerous islands, which had been mistaken by former navigators for a part of Corea itself. The island of Quelpaert, to the south of Corea, has been rendered famous by a number of shipwrecks.

The Coreans are a well made people, of an agreeable physiognomy, and very polished manners. In a state of subjection for ages to a foreign yoke, they have contracted the vices of servitude. They are much addicted to pleasure, loose, false, and so habituated to cheating and theft, that even the Chinese are taken in by them. Any seamen who are unfortunate enough to suffer shipwreck on their shore are reduced to slavery, a custom to which several barbarous nations have resorted under the influence of fear.

Diseases of an epidemic nature have struck such a terror into the Coreans, that they are in the practice of carrying their sick out to the fields, and leaving them without assistance to their fate.

Marriages are prohibited between relations within the fifth[c] degree. Children are married at seven or eight, and the bride lives in the house of her father-in-law. Polygamy is allowed, but the husband cannot take any except the first wife into his house. It would appear that the women, like those of China, are shut up in secluded apartments, and not allowed to be seen by strangers.

The dead bodies of persons of distinction are often kept for three years in a coffin before they are buried. They make the graves on high grounds, and by the side of the defunct they lay arms, utensils, and various articles of which he made use during his life.

The Chinese have introduced their arts, their sciences, and their language, into Corea. The literati of this country form a separate order in the state, and are distinguished by two feathers stuck in their caps. They undergo many examinations as in China; but their learning is confined to the philosophy of Confucius. They make use of the Chinese language and characters; the vernacular language of Corea is very different, and, like that of the Mantchoos, has a peculiar alphabet. They write with pencils made of wolf's hair,[d] and print their books with wooden blocks. Their language is too little known to enable us to form any judgment of its merits. It contains some Chinese and Mantchoo words; but the greater part of it seems to belong to neither.[e] Perhaps it may be a dialect similar to that of Jesso and the Kurile islands; or Corea and Japan may have contained an indigenous language and nation previously to their having received colonies from China and Mantchooria. It is left for future travellers to elucidate these questionable points.

Here, as in China, the philosophy of Confucius is the prevailing doctrine among the great and the learned. But the idolatrous religion of Foh or Buddha has many followers. The Corean ambassadors told the missionaries at Pekin, that the bonzes were kept in a state of degradation, and obliged to build their temples without the limits of their towns. There are monastic orders, or religious associations, the members of which lead an austere life, suffer with patience the most cruel persecutions, observe a great number of ceremonies, and in recompense for so many sufferings only meet with universal contempt. Of these, there are some whose rules oblige them to have the head shaved, to abstain from animal food, and to shun the sight of women.

The Coreans manufacture a very white and very strong paper from cotton. They also make fans and painted papers for ornamenting rooms, and very fine linens.[f] The other branches of their industry are unknown. The Chinese purchase their different articles in exchange for tea and silks. The Coreans also carry on some trade with the Japanese. Pu-shan, or according to other accounts, Kin-shan, is the port to which the Japanese vessels bring their goods, such as pepper, fragrant wood, alum, and buffalo's horns. In exchange, the Coreans give lead, cotton, raw silk, and ginseng root. Payments are made in small ingots of silver: the only coin is copper.

Corea, originally divided into several small states, was subjugated and civilized by some Chinese adventurers, at the head of whom was prince Kitsé. The wise laws given them by this conqueror produced a golden age; but that happy epoch is as far back as a thousand years before our vulgar era. It appears certain that Corea has been subdued by the Japanese, the Mantchoos, and the Chinese, in succession; the last alone have maintained their ascendancy. The kings of Corea, confounded among the other vassals of the Chinese empire, send to Pekin an annual tribute and ambassadors, who are not received with much distinction. In his own country, however, the king is absolute; a numerous court and a well furnished seraglio contribute to the splendour of his throne. All the inhabitants are bound to work for the sovereign for three months; and to the large revenues of his own domains this prince adds the produce of the royal tithe, taken in kind on productions of every sort. It appears from the account

[a] Duhalde, IV. p. 431.
[b] See Captain Hall's Account of Loo-choo.
[c] "Jusqu' au quatrieme."
[d] Kircher, China Illustrata, p. 232. Nieuhof, Ambassade, P. II. p 403.
[e] Seventy-six words in Witsen, Noord-en-Oost Tartarye, I. p. 52. Hervas, Arithmetica, p. 149. The pater-noster in pretended Corean, in the Oratio Dominica of M. Marcel, p. 26, appears to Adelung to be written in the Chinese dialect.
[f] De Guignes, Voyage à Pekin, I. 410, 411.

of Hamel,[a] that the nobles exercise, in their respective districts, a very oppressive feudal power; they allow no house but their own to be roofed with tile; the people are obliged to live under roofs of thatch.

The soldiery are very numerous, but they would not be formidable to Europeans. They are armed with bad muskets, bows, and whips. Their ships of war are superior to those of China, and appear to be imitations of the Portuguese galleys. They are mounted with cannons, and furnished with fire-pots.[b] The fortresses, situated on high mountains, have a sort of military monks for part of their garrison. According to one modern account, the Japanese hold the sovereignty of a part of Corea;[c] but M. Krusenstern is of opinion that the power of the Emperor of Japan is confined to the island of Tsoo-Sima, situated in the strait of Corea.

SYNOPTIC TABLE

Of the Nations vulgarly called Tartars, inhabiting the North, the Centre, and the East of Asia.

N. B.—This Table relates to all the nations mentioned in Books xxxvi.—xl.

I. TATAR RACE.

I. Turks or Southern Tatars.
  1. Turks of Turkestan.
  2. Turcomans, to the east of the Caspian Sea, in Persia, Armenia, and Asia Minor.
  3. Uzbeks, in Khiwa and Great Bukharia.
  4. Bukharians, in the towns of the two Bukharias.
     N. B. Perhaps they are descended from a mixture of Persians,[d] and Tartars.
  5. Karamans, or Turks of Karamania, originally from Turkestan.
  6. Osmanlis, or Turks of Anatolia, Constantinople, &c. originally from Turkestan.

II. Northern Tatars.
  7. Nogaï Tatars, in the Crimea, on the Kuban, and in Bessarabia. They call themselves Mankat, and have a mixture of Mongolian blood.
     a. Budziaks, in Bessarabia.
     b. Iedsan, in the Crimea, and on the Kuban.
     c. Iamboilook, on the Kuban.
     d. Kubanians, ditto.
     e. Kumuks, in Eastern Caucasus.
     f. Basians, in Upper Caucasus, &c. See Book XXV.
  8. Kumanians, from the banks of the Kuma at the foot of Caucasus, living in Great and Little Kumania, in Hungary.
  9. Tatars of Kiptchak. The old Khanat of Kiptchak included Kasan, Orenburgh, and Astrachan. This division may be sub-divided into
     a. Tatars of Kasan, who speak a pure dialect, and are the most civilized of the Tatar race.
     b. Tatars of Ufa and of Orenburg.
     c. Bashkirs, mixed with the ancient Bulgarians and Fins; in the government of Orenburg.
     d. Meshtchériaks, ditto, ditto.
     e. Karakalpaks, on the north of lake Aral.
  10. Kirghis, or Kirghis-Kaisaks, in their steppes, in Turkestan, Khiwa, &c.
  11. Siberian Tatars; remains of the Tatar inhabitants of the Kanat of Sibir or of Tura.
     a. Turalinzes, on the Tura.
     b. Tatars of Tobolsk.
     c. Tatars of Tara.
     d. Tatars of Tomsk.
     e. Barabintzes, in the steppe of Baraba.

III. Tatars mixed with Mongols, or Mongolian Tatars
  12. Tatars of Krasnoiarsk and of Kutznesk, with the Soyets. (See the account of Siberia, Book XXXVIII.)
  13. Katchinzes, ibid.
  14. Tatars of Tchulym, on the river of that name.
  15. Teleoots, or white Kalmuks, with the Abinzes, Beltirs, and Biriusses, on the Upper Yeniseï.
  16. Yakuts, on the Lena.

II. MONGOLIAN RACE.

I. Mongols.
  Kalkas, on the north of the Desert of Cobi.
  Ortosh, on the north side of the Great Wall.
  Tumet, on the north-east of Pekin.
  Nayman, ibid.
  Kortchins, ibid. near Tsitchacar in Mantchooria.
  Tchahary, north from Pekin, from 100 to 400 miles.[e]
  Karloses, ibid. 850 miles.[f]
  Sonjoot, &c. See the Dai-syn-y-tundschi.

II. Kalmuks or Derben Œrœt (Eleuts.)
  1. Choshots, near Lake Hoho-Nor and in Thibet. The Sifans of the Chinese.
     a. Yellow Sifans.
     b. Black Sifans.
  2. Songarians, more particularly called Eleuts.
  3. Derbets, joined to the Songarians and Torgots.
  4. Torgots, who emigrated from the Kalmuk country to Russia, and afterwards returned.
     N. B. Among the Kalmuks perhaps there are some other tribes, remains of the Oigoors, in the Cantons of Hamil, Turfât, &c.

III. Buriats, in the neighbourhood of Lake Baïkal.

III. MANTCHOO, OR TUNGOOSIAN RACE.

I. Mantchoos Proper.
  1. The Nieutché, or Mantchoos of Ningoota, (the Bogdoitchi of the old Russian authors.)
     a. The Atchari.
     b. The Mohho, &c.
  2. The Leao, or Kitans, ancient nation of Leaotong (?)
  3. Daurians, or Tagurians.
     a. Solons, near Mount Siolki.
     b. Humari, on the Amur or Seghalien, above its junction with the Songari-Ula.
  4. The Dutchery, on the Amur, above the Humari, removed into the interior by the Chinese government.
  5. Mantchoo Fishers, or the Yu-pitatse of the Chinese.
     a. Natki, or Fiatta.
     b. Ghiliaiky, or Ketching, (doubtful origin.)
     c. Orotchys, on the Bay de Castries.
     d. Bitchys, more to the south.
     e. Mantchoos, settled in the north part of Seghalien island

II. Tungooses, or Œvœn.
  1. Tungoos Hunters, in the north, on the Tunguska rivers.
  2. Tungooses, whose employment consists in keeping droves of rein-deer,[g] in the south near the Baïkal, &c.
  3. Tungoos Fishers, or Lamuts, to the east of the former.
     N. B. These are only vague subdivisions. There are seven or eight dialects which are little known. The Tungooses are called by the Chinese, She-Goei and Solons, by the Yukaghirs, Erpeghi. The names which they give themselves are Œvœn and Donki.

IV. SAMOIEDE RACE.

I. Samoiedes Proper. From the Petchora in Europe to the east of the Yenisei.
  1. Petchorians or Ingorians, on the east side of the Petchora.
  2. Obdorians or Objoodirs, on the Obi.
  3. Tihijoodirs, ibid.
  4. Guarizi, at Waigatz Straits.
  5. Tassowski, (Russian name,) on the Tass.
  6. Yuraks, east from the preceding.
  7. Turukhanskoi, (Russian name,) near the mouth of the Yenisei

II. Ostiaks of Narym and of Tomsk.

III. Hordes of the Upper Yeniseï.
  1. Kamatchinzes, on the Kam.
  2. Taragams and Taiginzes, on the Taasowa.
  3. Tubinski, on the Tuba, scattered.
  4. Koibals, neighbourhood of Kutznesk and Krasnoiarsk.

a H. Hamel, Journal, &c. Rotterdam, 1668, 4to.
b "Pots a feu" hand grenades.—P
c Zach's Correspondence, I. 51.
d The author adds here, "ancient *Seres*;" but from the opinion expressed in note, p. 368, that the *Seres* were identical with the Chinese, the translator has omitted it.—P.
e 138 to 534 versts."
f "1138 versts."
g Usually called Rein-deer Tungooses.—P.

5. Mators or Madors, on the Tuba.
6. Soyets, in the Sayanian Mountains.

N. B. These hordes seem to be the primitive stock of the Samoiedes.

V. FINNISH RACE, OR MIXED WITH FINNS.

I. Woguls,
II. Permiaks,
III. Ostiaks of the Obi, &c.

} See the Table of the Finnish Tribes in the Geography of Europe.

VI. OBSCURE EASTERN RACES.

I. Ostiaks of the Yenisei.
1. Ostiaks of Pumpokol.
2. Arinzes, in the District of Krasnoiarsk.
3. Kotowzes, on the Kan.
4. Asanes, on the Ussolka, scattered.

II. Yukaghirs, mouth of the Lena; they call themselves Andon Domni, and are called Yedel by the Koriaks.
III. Tchuktches or Tchukotchis.
1. Tchukotchis, in the east.
2. Shelagi, in the north.
3. Ashushalat islanders, &c.
IV. Koriaïks.
1. Tchantschu, on the Gulph of Penjina.
2. Tumuhutu, nomades.
3. Elutetat or Olutorzi, on the Olutora.
V. Kamtchadales, who call themselves Itelmen.
VI. Kurilians, called in their own language Aino, and Mo-Sin in the Japanese Histories. Inhabitants of the Great Kuriles, of Iesso, and of Seghalien Island. (See Book XLI.)
VII. Coreans, &c. &c.

BOOK XLI.

JAPANESE ISLANDS.

Japan; the Islands of Iesso; the Kurile, and Loo-Choo Islands. Critical inquiries on Iesso.

To the east of Mantchooria lies the basin of the sea of Japan, the north end of which has been named by La Perouse the Channel of Tartary. Steep shores, destitute of large rivers, surround this dark, foggy, and tempestuous mediterranean. On the north it communicates by two straits with the sea of Okhotsk. One of them, near the mouth of the river Amur, separating the continent from Seghalien Island, is choked up with sand covered with reeds, and does not admit the passage even of a small boat. La Perouse's Strait, known formerly under the name of the strait of Tessoï, affords, on the east, a passage into the sea of Iesso, a part of the sea of Okhotsk. The strait of Songaar forms a communication between the sea of Japan and the great Eastern Ocean, or rather what is called the Northern Pacific. On the south, the strait of Corea opens into the Chinese seas. A chain of considerable islands forms the barrier by which the Japanese mediterranean is separated from the Great Ocean; and this chain, which is more than sixteen hundred miles[a] long, is connected again with the Kurile Islands on the north-east and with those of Loo-choo on the south. The Japanese occupy the greater part of these islands.

In the north of the Japanese empire, two great islands form, with a number of small ones, an independent archipelago. It is here that geographical criticism amused itself with sketching the famous country of Iesso. At first it was believed that this country, known by its connection with Japan, was a continent or a large island between Asia and America; then it was confounded with Kamtchatka, or rather was joined with the country then called Russian Tartary, for Kamtchatka was not known till 1696.

At last, the voyage of the Dutch navigator De Vries, commanding the ship Castricom, threw the first ray of light on this part of the world. It was found to a certainty that these lands were as much separated from the continent of Asia on the north-east as from Japan on the south. But three points continued doubtful. The land seen by De Vries presented one well marked island, the States Island: but to the east, the extent of the Company's Land was vaguely understood. Some accounts of little authenticity, and among others that of Jean de Gama, gave rise to the idea that this land extended to America. On the other hand, the Castricom having coasted the land of Matsumai or Iesso on the east and north-east, was repelled from the strait of Tessoï by the currents. The fogs prevented her even from seeing it; and when she touched on the southern and eastern coast of Seghalien Island, it was considered as forming a continuation of Iesso. Some geographers might thus have believed that all these coasts, instead of forming two islands, belonged to the same peninsula of Chinese Tartary. The log-book of the Dutch vessel, the Breske, not having been consulted, it was not known that the navigators belonging to that ship had determined the strait of Songaar to be such as we now know it.[b] The north point of Japan being placed two or three degrees too far south, created an immense gap between that country and Iesso, where the Japanese charts laid down a very narrow arm of the sea.[c] About the same time, some particulars were known through the Chinese missionaries respecting the island of Seghalien, and the existence of a strait called Tessoï. The Jesuit, Father Des Anges, even saw this strait, described its terrible currents, and learned that the land beyond it, the island of Seghalien, was named Aïno-Moxori. This name signifies the isle of the Aïnos;[d] but in 1620 this name had no meaning among geographers, and they could draw from it no conclusion. D'Anville made two attempts to delineate these countries, and by a chance not uncommon in geographical criticism, his last idea was the most remote from the truth. He gave the strait of Tessoï its proper place, but he connected the south part of the island of Seghalien, or Aïno-Moxori, with the continent of Mantchooria, then called Chinese-Tartary, and figured this same island, under very small dimensions, opposite to the mouth of the river Amur.[e]

The Russians, in visiting the Kurile islands adjoining their possessions in Kamtchatka, necessarily arrived at Iesso. The Cossack Kosirewski reached, in 1713, the isle of Koonasheer, making part of the coast of the Iesso of the Dutch. In 1736, Spangenberg, a Dane in the Russian service, examined the isles of *Ooroop*, or the Company's Land; that of *Atorkoo*, which is States Island; also Koonasheer, Tchikotan, and Matsumai, or Iesso. He even made Japan, but he had neither ships nor instruments corresponding to his talents and his courage. At last the Russian Potouchkew, in 1777, sailed by the west, round the islands of Atorkoo and Ooroop. These discoveries were placed too far to the south,[f] from the respect paid to geographical systems on the position of Songaar. Two bad sketches of these discoveries,

[a] "600 Fr. leagues."

[b] Witsen, Noord-en-Oost-Tartarye, 2d edit. p. 138.

[c] Kæmpfer's Japan, I. 78. (Dohm's German edition.)

[d] *Aino*, the name of the nation or people which inhabits Iesso, the Kuriles and Seghalien. *Modjeri*, island. Vocabulary of the language of Iesso, communicated in MS. by M. Titsingh.

[e] D'Anville, Carte générale de la Tartarie Chinoise et Carte de l'Asie, IIe part.—Ph. Buache, Consid. géog. et phys. sur les Découv. p. 75. &c.

[f] Charts of the Russian discoveries, published at Petersburgh, 1773 and 1787.

taken from the Russian records, and published by M. Lesseps, completed the mass of confusion and fruitless conjecture in which the subject was involved.

At last the unfortunate La Perouse commenced the discovery of the true method. He entered by the Sea of Japan, found the channel which separates Mantchooria from the countries of Iesso, penetrated to the sandy shallow strait which separates these countries from the continent, traversed another strait to which his name has since been properly given, and thus obtained for us a view of this archipelago altogether new.

The English navigator Broughton has confirmed the correctness of the Dutch charts and of those of Kæmpfer, with regard to the strait of Songaar or Matsumai. In consequence of the investigations of this gentleman, the northern coast of Japan has obtained its right position in latitude. But Broughton has given geographers a new subject of dispute, by maintaining that there is no strait between Mantchooria and Seghalien Island.

La Perouse, forced by winds and other circumstances to leave this channel before he had explored it to the end, had interrogated with much care the natives both of the island and of the continent. The former assured him that their country was surrounded with water, and gave him a sketch of the strait which separated it from the continent.[a] The people of the continent told him that the boats which came from the mouth of the river Amur to the bay of De Castries, were dragged over a narrow isthmus of sandy ground covered with sea weeds.[b] This navigator remarked, besides, that the depth of the water rapidly decreased at the extremity of the channel, and that no current was perceivable in it. He seems to have been satisfied that the strait existed, but that, obstructed by sand and sea weeds, it only afforded a narrow passage to small boats. Broughton goes farther. He says that having been twenty-two miles[c] farther to the north than La Perouse, he arrived at a bay which was only two fathoms deep, and which was shut in on all sides by low and sandy ground. He is persuaded that this tongue of land, which was examined by his boats, is in no part interrupted, and that Seghalien is a peninsula. Mr. Krusenstern, who did not go near this strait, but visited that which is situated to the north of the mouth of the river Seghalien, supports the opinion of Broughton by extended reasonings.[d] The water which he found in the gulf formed by this river being almost fresh, furnished a specious argument, which appeared decisive to him and his companions. If the Gulf of Seghalien communicated ever so little with the channel of Tartary, the salt waters of that arm of the sea would have mingled with those of the gulf. M. de Krusenstern supports his views by the testimony of the inhabitants of De Castries Bay, quoted by La Perouse, and by the observations of Broughton, and says he entertains no doubt of the existence of a sandy isthmus rendering the land of Seghalien a peninsula; but he thinks that this is of very recent formation, and that Seghalien was really to be considered as an island at the time when even the modern Japanese and Chinese charts were constructed, all of which represent it as detached from the continent.

It is to be regretted that nautical and political considerations prevented Krusenstern from substantiating on the spot the existence of this isthmus. His reasonings as they stand are not unanswerable. Two or three windings of the beach, some islets and sand-banks, two or three narrow canals filled with the enormous rushes which grow over the whole of this coast, encumbered also with floating meadows of sea weeds, would afford a sufficient explanation of the fact that the salt water of the channel of Tartary did not extend to the Gulf of Seghalien. If to the west of this shallow strait there is a tongue of low land almost divided by two small rivers, as there certainly is one to the north of the mouth of the Amur, at the place which the Russians call Gilazkaia Perewoloca, and the Chinese *Gole*,[e] it is quite natural to suppose that the people of the continent have sometimes dragged their light boats over such a stripe of land, to avoid the difficult navigation of the strait itself. This is what the Cossacks of the seventeenth century did, when coming down the Amur, and wishing to reach Udskoi, they prefered carrying their boats over the tongue of land Gilazkaia, to the plan of doubling the promontory which M. Krusenstern calls Cape Romberg. According to this hypothesis, which is singularly favoured by the very remarkable details of a map of M. D'Anville,[f] we may conceive how Broughton may have been deceived by mistaking a cove in the strait for the strait itself. Besides, if this navigator found a sandy isthmus, even supposing it to have been of considerable width, why did he not perceive the sea on its opposite side?

For these reasons, till such time as new light is thrown on the question, every candid geographer will retain the strait pointed out by D'Anville, by the missionaries, and by the Chinese and Japanese charts, as separating Seghalien, or Tchoka, as it is also called, from the continent of Mantchooria.

Krusenstern examined with great care the western shores of the isle of Iesso, and the south-eastern and northern shores of Seghalien Island. His account, and those of La Perouse and Broughton, are the only published sources from which certain ideas can be formed of this archipelago; but the kindness of M. Titsingh, a Dutch gentleman who resided a long time at Japan, enables us to avail ourselves of two Japanese descriptions for details which throw a new light on the geography and history of these countries. One is called "*Ieso-Ki*, or a description of Iesso, by Araï-Tsikogo-no-Kami, instructor of the Ziogoen (military emperor) Tsoena-Josi," written in 1720. The other is called "*Icso-Ki*, or a description of Iesso, with the history of the rebellion of Samsay-In, by Kannamon, Japanese interpreter," written in 1752. Besides these, M. Titsingh has communicated an account of two Japanese maps, which will appear in our periodical work, the "Annales des Voyages." We shall take the northern coast of Japan for our point of departure.

The isle of MATSUMAI, situated to the north of that of

[a] La Perouse, III. p. 36. [b] Idem. p. 72.
[c] "8 Fr. leagues."
[d] Krusenstern's Voyage round the World, II. p. 191—195. (original German edition.)

[e] Muller's Memoir on the river Amur, in Busching's Geog. Mag. II. 507, 508.
[f] Asie, III[e] part. 2[e] feuille.

Niphon, is called in the Japanese language Iesso, or "the Coast;" it also receives the name of Mo-Sin, or "the Hairy Bodies." The Mo-Sins formerly occupied the northern parts of Japan as far as the mountain Ojama. Driven back into their own island, they have there been repeatedly subdued; and it is only in the south part of the island of Seghalien that they preserve their independence. According to Krusenstern, the Mo-Sins call themselves Aïnos.[a] This nation is distinguished from the Japanese by a stature somewhat taller, and a more robust frame. They have very thick black beards, and the hair of their heads is black and somewhat frizzled. Both the men and women tattoo their lips with figures of flowers and animals. The rich among them dress in Japanese or Chinese manufactures; the common people wear a stuff made of a fibre obtained from a species of willow bark. At the early age of ten the children learn to dive in the sea, and to leap over tight ropes. The Aïnoos excel in both exercises. Some of them can leap six or seven feet high. They hunt the deer; their principal arms are the bow and arrows. Small detachments of Japanese can beat thousands of the Aïnos. The hereditary chiefs of the villages acknowledge themselves the vassals of the Japanese prince of Matsumai, and pay him a tribute of the skins of otters, seals, bears, elks and beavers, likewise of salmon, falcons, and other productions of their country. They live together without established laws, and almost without religious worship; at least a few libations and the lighting of fires in honour of Kamoï, a Japanese deity, are the only religious ceremonies that have been observed among them. They have no alphabet, and no coin. They trade entirely by barter. They repair to one of the Kurile islands, lay down their goods on the beach, and return on board their vessels; the Kurilians come down, examine the goods, and place their own by the side of them; and by a series of such negociations in dumb show their bargains are concluded. They allow polygamy; adultery they resent and revenge. If an attempt is made by a married woman to seduce a man, he demands her earrings, and with these pledges in his hand he is safe from the attacks of the injured husband. Brothers marry their sisters. Their tribes are so many separate family associations, which seldom form mutual alliances. Their lamentations for the dead are expressed by mock fights among the relations, in which bloody wounds are sometimes inflicted. To these curious accounts given by the Japanese writers very little has been added by European navigators. Broughton informs us that these people are uncommonly hairy over the whole body. Krusenstern considers this statement as an exaggeration, although it is supported by the testimony of the Dutch, and although it appears to be confirmed by the Japanese accounts.

The language of the Aïnos seems to be equally foreign to the Japanese, the Mantchoo, and the Kamtchadale. On comparing about a hundred well chosen words with the corresponding terms in several of the languages of Asia, and of Oceanica, we can find no indication of affinity; but a more intimate acquaintance with the structure and the roots of many of these languages would be requisite to enable us to pronounce with any decision on the question. This language, though less sonorous and less mellow than the Japanese, has no savage rudeness in its articulation.

The following are a few specimens of it:

Heaven,	*likita.*	Night,	*atziroo.*
Earth,	*sirikata.*	Man,	*okkay*
Sun,	*tofskaf.*	(In Japanese	*otoko.*)
Moon,	*koonetsoe.*	Woman,	*mennokoosi.*
Stars,	*noro.*	Father,	*fanpé.*
Mountain,	*kimla.*	Mother,	*tafoo.*
Island,	*modjiri.*	(In Japanese	*fafa.*)
Shore,	*siri.*	Fire,	*abé.*[b]
Day,	*tekaf.*		

The isle of Iesso presents on all sides lofty mountains covered with a beautiful verdure. The name In-soo, given to the island, according to Broughton, expresses this circumstance; the first syllable signifying *high*, and the second, *green.*[c] It abounds with firs, willows, and many other trees. Tussilagos[d] and the Kamtchatkan lily[e] thrive in it, showing that the climate is moist and cold. There are many creeping shrubs. The reeds have the same enormous size as at the mouth of the river Amur. Among the cultivated vegetables of which trials have been made by the Japanese, millet, pease, and beans, have succeeded. The animals of the island are eagles, three sorts of falcons, bears, and deer. They take the bears when very young, give them to their women to suckle, bring them up like favourite dogs or pigs, and, when grown up, confine them in cages till fat enough for killing. The family mourn over the death, yet eat the body of the animal; a custom which reminds us of the Ostiaks.[f] Otters and seals are described by the two Japanese authors, under many different names. Whales come to the bays and river mouths in quest of the immense swarms of *nising*, a kind of sprats, which are found there. Salmon also abound to such a degree that they may be taken with the hand. The sea-leech is caught and sold to the Japanese. Several of the fuci are used as common articles of food.

Matsumai,[g] or "the Town of the Strait," (Matsi being the word for a strait,) is built near the south end of the island. It is a Japanese fortress, and inaccessible by land. Other military posts extend along the western coast all the way to the northern point. In coasting the western shore, we meet with the islands of Osima, Kosima, Okosiri, Riosiri, (which contains the Pic de Langle of La Perouse,)[h] and Refoonsiri. The large gulph which extends into the country, is called by the Russians the Gulph of Strogonof. The last station to the north is Notsjiab, the Notzamboo of Krusenstern.[i] Soyea is on a bay farther to the east. On the north-west coast the Aïnos, though subject to Japan, live by themselves. Atkis, their principal village, is on the north-east coast. A Russian officer, M. Laxmann, visited in 1792 the harbour of Kimoro, which belongs to it.[k] M. Titsingh's manuscript contains no such name

[a] Krusenstern's Voyage, II. p. 74.
[b] *Ieso-Ki* of *Kannamon*, MS.
[c] In-tsooi.
[d] Colts-foot.
[e] "Lis saranne."
[f] See Book XXXVIII. p. 356.
[g] "Matsimai."
[h] Krusenstern's Voyage, II. 56.
[i] Idem. II. 50.
[k] Storch's Russia under Alexander I. fascic. 6. (in German.)

as this last ;[a] but Atkis is indicated under that of Atskesi. A firth or strait which has received no name separates the isle of Iesso from that of Chikotan, one of the Kurile islands, claimed by the Japanese. The south-east coast has been surveyed by the Dutch and by Broughton. The country is covered with magnificent forests. Volcano Bay is a circular basin of a very picturesque appearance. There is every reason to suspect the existence of a volcano in a state of activity in this quarter, although it has not been positively ascertained. The Japanese divide this island into five districts, but we are unacquainted with their respective limits.

To the north of the island of Matsumai, the long island of SEGHALIEN extends, called by the Japanese OKU IESSO, or the upper Iesso, sometimes Kita Iesso, which means either northern Iesso, or the Iesso of Kitay, (China.) The Aïnos, according to our Japanese geographers, call it Karato, to which name the Japanese add the termination *sima*, signifying island. According to Krusenstern, the name given to it by the natives is Saldan ; according to La Perouse, Tchoka ; but the latter appears to be only the name of a leading village, which is written Tchuchin on M. D'Anville's map. The other two names may probably also turn out to be local.

La Perouse, who visited the west coast, gives a very favourable account of this people, taken in a moral point of view. The intelligence of these poor islanders struggles against a severe climate. They live by fishing and hunting. They tattoo their persons, and, like the Aïnos of Iesso, they make stuffs of the willow bark. Their language contains some German and some Mantchoo terms. A boat in their language is *kahani*, in German *kahn*. The word *ship* has exactly the same meaning with them as in English.[b] So has the word *two*, as pronounced by the English. In Iesso *tsootsoob* is the word for the number two. This island, very nigh in the middle, becomes flat towards the south end, where it seems to have a soil favourable for cultivation. Vegetation is extremely vigorous. Pines, willows, oaks, and birches, are the principal forest trees. The surrounding sea is full of fish. The rivers and streams abound in salmon and trout of the best quality. The hills are covered with rose trees, with angelica, and Kamtchatkan lilies.[c]

Krusenstern examined Aniwa bay at the south end of the island. Here the Japanese had an establishment, which the Russians have destroyed ; and it is supposed that the latter nation mean to colonize it. The whole eastern coast, examined by the same navigator, presented woody valleys, behind which mountains covered with snow seemed to lose themselves in the clouds.[d] At the 51st degree of latitude the ground becomes low, and nothing is to be seen except sandy downs and hills.[e] The south part is inhabited by the Aïnos. The east coast seems to be uninhabited ; the north-west coast, near the mouth of the river Amur, is occupied by a colony of Mantchoos.

To the north-east of the isle of Iesso, a chain of islands extends all the way to the south point of Kamtchatka. The Russians call them the KURILES. They reckon twenty-two of them, including Iesso. The inhabitants of this last isle reckon thirty-six, which they comprehend under the name of Kooroo-Misi, which is probably of Japanese etymology, and signifies the "Road of Sea-weeds ;" *kooroo* signifying a species of fucus, and *mitsi* a road. The charts in Krusenstern's voyage lay down only twenty-six ; the others will be discovered when the eastern shore of Iesso is better explored. D'Anville lays down twenty-nine to the north of the Boussole channel, and thirty-four in all. This archipelago is naturally divided into two parts, the chain on the south of the Boussole channel, and that on the north. The one which is nearest Iesso, and is claimed by the Japanese government, may be called the Great Kuriles ; and the other, adjoining to Kamtchatka, the Little Kuriles.

The latter, inhabited by Kamtchadales who left their native country on the approach of the Russians, present nothing but a chain of precipitous barren rocks, which are mostly volcanic. Poromu-Shir[f] is the largest. Sumtchu shows some indications of silver mines. Ana-Kutan, Arama-Kutan, Syas-Kutan,[g] and several others, contain extinguished volcanoes. That of Rashotka, called Sarytchew Peak by Krusenstern, is constantly burning, and also that of Ikarma. In Usi-Shir there are warm springs issuing with violent jets.

The Great Kuriles promise more considerable advantages to intelligent colonists. That of Ooroop,[h] the "Company's Land" of the Dutch, the Nadeshda of some Russian maps, and the Ooroowoo of the Japanese manuscript, Ieso-Ki, has firs and cherry trees. Here begin the hairy Kurilians of the same race with the Aïnos of Iesso and Seghalien. Etorpoo, the "States Island" of the Dutch, the Atorkoo of Krusenstern's map, and the *Ietorofo* of the Japanese, contains fine forests, which, however, are at times seriously threatened by an adjoining volcano in the same island. The plains and mountains of Koona-Shir are covered with the most beautiful larches and firs. The *Pinus cembra* thrives in it. It was probably at Chikotan that Steller and Spangenberg believed they saw vines, and even the wild citron of Japan. These navigators certainly did not find the oak and the walnut except on the coast of Iesso.

It is among the Great Kuriles that we are to look for a part of the alleged discoveries of Beniowski.[i] This enthusiast imagined that he saw at Koonashir considerable towns. There was a pearl fishery on its coast. His Tchulgan-Idzon, rich in copper, and Maanas-Idzon, abounding in gold, are no more to be found. But the Japanese geographers point out in the isle of Iesso a district called Figasi, and a village called Kawa, which are evidently the isles of Fiassi and Kawith of the Polish navigator. His accounts of silver and copper mines, horses, red pearl or coral, which he found in these countries, contain nothing incredible. In giving

[a] "Among two hundred proper names."
[b] "*Chip* vaisseau ; *ship*." The translation above is correct if the word *chip* is spelt after the French orthography.—P.
[c] Voyage de M. La Perouse, IV. p. 73. III. 40, 43.
[d] Krusenstern, II. p. 92, 96, 144.
[e] Idem, p. 153.
[f] *Shir* or *siri* is the term for an island in the language of Iesso.
[g] Kutan is from *Kotang*, the Iesso term for a country.
[h] "Urup."
[i] See his Voyage translated by Forster, I. 368.

the town of Matza 2000 houses he probably exaggerates; but the town exists, and is called Matzige.[a] It is on the whole rather rashly that this navigator has been charged with intentional imposture.

We now proceed to describe a country more frequently treated in detail than those we have just examined. The three islands of Niphon, Kiusiu, and Sikokf, surrounded with a multitude of smaller islands, form the kingdom, or, as it is sometimes called, the EMPIRE OF JAPAN. The Chinese at first called it Yang-hoo, or the "Workshop of the Sun;" then they called it Noo-Kooé, or "the Kingdom of Slaves;" and finally, Je-pen, or Je-poon, "Country of the Rising Sun."[b] Marco Polo knew it under the corrupted name of Xipangu. The isle of Kiusiu has from north to south a diameter of nearly two degrees, or 130 miles,[c] and its greatest length is about 220.[d] That of Sikokf is 100 miles long, and 55 broad.[e] The large island of Niphon lies south-west and north-east; its length is not less than 1600 miles,[f] but its breadth is in every part moderate. Its medium breadth is not more than 160 miles,[g] though it may be the double of this between the extremities of two projecting points. The surface of the Japanese states may be reckoned at 122,720 square miles.[h] The population is rated at between 15 and 30 millions by the most moderate authors. This regular and flourishing state, at the further extremity of Asia, is withdrawn from the researches of travellers by the cautiousness of its policy.

The whole country is full of mountains and hills, and its coasts beset with steep rocks, which are opposed to the waves of a stormy ocean. The plains are pervaded by numerous rivers and small streams. But the hills, the mountains, and the plains, enriched with many singular plants, present the interesting picture of human industry amidst the traces of the revolutions of nature. The most celebrated mountain of Japan is that of Foosi, which is covered with snow through nearly the whole year. In the neighbourhood, the mountains of Faconi surround a small lake of the same name.[i] Some of the mountains contain volcanoes. The greater part of them abound in evergreen trees and limpid springs. It is said that there is near Firando an island entirely volcanic; and several others of the same kind are mentioned in the surrounding seas.[k] In the province of Figo there is a volcano which gives out many flames.

The rivers of Japan cannot have a long course. The Jedo-Gawa, which passes by Osaka, has several bridges of cedar from 300 to 860 feet long. The Ojin-gawa[l] and the Fusi-gawa are also broad and rapid rivers. In Japanese history, the river Oomi is mentioned as having in one night issued out of the earth.

One of the largest lakes is that of Oitz, from which two rivers proceed, one towards Miaco, and the other to Osaka. This lake is fifty Japanese leagues long, each league being as much as a horse goes in an hour at an ordinary pace; its breadth about a third. The delightful plain which surrounds it is rendered sacred by containing 3000 pagodas.

These islands experience by turns the extremes of heat and cold. The summer heat, however, is frequently alleviated by the sea breezes. In winter the north and north-east winds are exceedingly sharp, and bring along with them an intense frost. During the whole year the weather is variable, and much rain falls, particularly in the *satsaki* or rainy month, which begins at midsummer.[m] According to observations, the highest degree of heat at Nagasaki is 98° in the month of August, and the greatest cold 35° in January. The snow lies some days on the ground, even in the southern parts. Thunder is heard almost every night in summer; storms, hurricanes, and earthquakes, are very frequent. The genial rains conspire with human labour and manure to overcome the natural sterility of the soil.

The laws enjoin agriculture as one of the rigorous duties of the Japanese. Every spot is under cultivation, with the exception of the most impracticable mountains. Exempt from all feudal and ecclesiastical exactions, the farmer cultivates the land with zeal and success.[n] There are no commons. If a piece of land lies without culture, a neighbouring farmer who is more active is at liberty to take possession of it. There are no meadows; but the attention paid to manure is very great. On the sides of steep hills stone walls are raised which sustain plots of ground sown with rice or with vegetables. Rice is the principal grain. Buckwheat, rye, barley, and wheat, are rarely cultivated;[o] potatoes are of indifferent quality; but various sorts of beans, pease, turnips, and cabbage, succeed well. The rice is sown in April, and reaped in November. In this last month wheat is sown to be harvested in the following June. Barley also lies in the ground during winter.

The plants of Japan very much resemble those of China, which is probably owing to a mutual interchange of the most useful species. The tea shrub grows without culture in the hedges. The most superb bamboos abound in all the low grounds; ginger, black pepper, sugar, cotton, and indigo, though perhaps originally from the more southern parts of Asia, are cultivated in Japan with great success and in large quantity. In the interior the sides of the lower mountains produce the Indian laurel, and the camphor-tree; likewise the *Rhus vernix*, the bark of which yields a gum resin which is regarded as the leading ingredient of the inimitable black Indian varnish. Besides the sweet China orange, there is a wild species peculiar to Japan, the *Citrus Japonica*. The European vegetation is mingled with that of southern Asia. The larch, the cypress, and the weeping willow, which make their appearance in all the temperate countries between Japan and the Mediterranean, terminate here. The case is similar with the *Papaver somniferum*, or opium-bearing poppy, the Jalap, and the lilac.

The Japanese have none of our apples, but they have

[a] Manuscript Chart of Titsingh.
[b] Kæmpfer's History of Japan, I. 73, 74, (German edition.)
[c] "50 Fr. leagues."
[d] "80 Fr. leagues."
[e] "36 by 20 Fr. leagues."
[f] "300 Fr. leagues."
[g] "30 Fr. leagues."
[h] "16,000 sq. Fr. leagues."
[i] Thunberg, t. III. p. 164, (Langlès' translation.)
[k] Kæmpfer, t. I. p. 166, (French translation.)
[l] The word *gawa* signifies river, as it does in Celtic.
[m] Thunberg, t. III. p. 234.
[n] Idem. t. IV. p. 80, &c.
[o] Kæmpfer, I. 120, &c. (in German.)

pears of considerable size, shaddocks,[a] Kaki figs, or Japanese date-plums, (*Diospyros kaki,*) and large oranges. (They have the art of making sweet-meats, and preserving a variety of fruits with spices, such as bananas, the bread fruit (jacquier,) strawberries, cocoa-nuts, and many others.) They procure oil for cookery as well as for light from sesamum, from the sumachs, from the *Taxus gingko*,[b] from the *Laurus camphora*, the *Laurus glauca*, the *Melia azedarach* or common bead tree, and the cocoa-nut. They raise a great abundance of silk worms. The cotton plant furnishes them with light stuffs, and the *Urtica nivea* with durable cordage; they make paper and fans of the bark of a species of mulberry, of the *Licuala*, and the *Borassus flabelliformis;* bottles of the calabash, combs of the *Myrica nagi*, and all sorts of furniture of the *Lindera*, different species of pine, box-wood, cypress, and the *Taxus macrophylla*, or long-leaved yew. The eye is delighted with the mixture of cocoa trees, fan-leaved palms, cycases, and arborescent *mimosas*, which adorn the sea beach. The hedges by which the possessions are divided are composed of *Lycium Japonicum*, three-leaved oranges,[c] *Gardenias*, *Viburnums*, and *Thuyas*, besides several twining plants of which they make arbours and covered walks. Several plants useful in medicine are also found here, such as the *Convallaria Japonica*, *Acorus aromaticus*, *Smilax China*, in the virtues of which they were instructed by the Swedish traveller Thunberg; the *Corchorus Japonicus*, the *Laurus camphora*, the *moxa*, the snake wood,[d] and the mungo root.

The maxims of Japanese industry have almost banished from the empire two domestic animals, which in all other countries are the most common, goats and sheep. The first are deemed hurtful to agriculture, and the wool of the second is superseded by cotton and silk. Pigs are also proscribed, as pernicious to agriculture; the neighbourhood of Nagasaki is the only place where any are to be seen, and they have probably been introduced by the Chinese.[e] These islands produce on the whole but few quadrupeds. In Thunberg's opinion, one province of Sweden contained as many or more horses than the whole empire of Japan; there are very few cattle; a variety of the buffalo, with a hump on the back, is employed in agriculture, and very small oxen; yet the caprice or personal taste of the sovereign has created a law of the state in favour of dogs, which are fed at the expense of the towns, and are treated with much kindness and respect. The principal food of the Japanese consists of fish and vegetables. Fowls and ducks are kept chiefly for the sake of their eggs. They add to the ordinary vegetables many sorts of marine plants, *Fuci* and *Ulvæ*, which are prepared in various ways. Game is not plenty; there are wild geese, pheasants, and partridges, but very few wild quadrupeds. The bear met with in the northern parts is black, with two white spots of a crescent form on the shoulders; the flesh, which is eaten, is compared to mutton, but is tougher. The wolf is sometimes seen in the northern provinces; there are also some foxes; the latter are held in universal detestation, and considered as evil spirits clothed with an animal body.

The precious metals, gold and silver, abound in the empire of Japan. This was well known at one time to the Portuguese, and afterwards to the Dutch, who exported considerable cargoes. Gold is found almost every where; but, in order to keep up its value by scarcity, there is a prohibition against digging beyond a determinate depth; and no mine can be opened or worked without the express permission of the emperor, who claims two-thirds of the produce, leaving a third to the proprietor of the land. Gold is found in small quantities in the sand, but the greater part of it is extracted from copper pyrites. The purest and richest mines are at Sado, in the largest of the small islands adjoining Niphon; those of Suremga hold the next rank. Silver seems to have been formerly more abundant; the Japanese consider it as rarer than gold, though here as every where else, it is of inferior value in exchange. It is said that there are rich silver mines in the province of Bungo, and the most northerly parts near Kattami; but the two islands called the Gold and Silver Islands (*Ginsima*, and *Kinsima*,) are probably fabulous creations of national vanity, unless we should suppose them to be indications of some ancient commercial connection with Mexico, or imitations of the tales of Ptolemy on the *regio aurea et regio argentea*.

Copper, mixed largely with gold, forms the chief wealth of several provinces, and the most valuable of their exports. The finest and most malleable comes from Saruga, Astinga, Kino, and Kuni; the last is considered as the most malleable; that of Saruga contains the largest proportion of gold. There is also a great number of copper mines in Satsuma. Iron seems to be rarer in this country than any other metal; but it is found in the provinces of Mimasalla, Bitsju, and Bisen; the Japanese do not make so much use of it as most other nations; they employ it however in the manufacture of arms, of knives, scissars, and other necessary instruments. The gold and copper are coined into money.

Mr. Thunberg received some amber in a present, brown, yellow, and iridescent, which was said to have been found in the country; sulphur is found in great abundance,[f] and pumice-stone, shewing the former existence of volcanoes. We are informed that mineral coal is found in the northern provinces; there are red agates with white veins, which are used for making buttons and snuff-boxes.[g] According to Kæmpfer, calamine is imported from Tonquin, but tin is found in the province of Bungo; perhaps this pretended tin is only the white copper of China. A reddish-coloured naphtha is employed for burning in lamps. Thunberg saw asbestos, porcelain-earth, and white marble.[h] Sulphuret of mercury in its primitive crystalline form, and in lamellated masses, has been brought from Japan. Baron Wurmb, a German *savant* settled at Batavia, received from Japan, asbestos, capillary schorl, hydrophane, and the atmospheric stones formerly called thun-

[a] "Pamplemousses."
[b] *Salisburia adiantifolia*, or *Gingko biloba*.—P.
[c] *Citrus Trifoliata*.—P.
[d] *Strychnos Colubrina*.—P.
[e] Thunberg, IV. p. 95.
[f] Thunberg, t. IV. p. 402.
[g] Kæmpfer, I. p. 121, 122, (in German.)
[h] Thunberg, III. p. 203.

derstones, denominated in Japanese *kaminary sakki*.[a] There are several warm mineral springs, to which the inhabitants resort for various diseases.[b]

The empire is divided into about seventy principalities,[c] ruled by chiefs, who are vassals of the emperor of *Kubo*.[d]

The capital of the empire of Japan is called Iedo, and is situated on a bay on the east coast of Niphon. The houses are only one or two stories high, with shops in front. The harbour of this place is so shallow, that a European vessel is obliged to anchor thirteen or fourteen miles[e] off from the shore. The Emperor's palace is surrounded with stone walls, and ditches with drawbridges. It would form of itself a considerable town, being about fifteen miles round,[f] while the whole city is nearly sixty.[g][h] Iedo is the residence of all the feudatory princes for one half of the year. Their families are always kept there as a sort of hostages for their fidelity. The palace consists of a great number of apartments, and occupies an immense space. The hall of a hundred mats is 600 feet long and 300 wide. The palace has a square tower, a mark of pre-eminence, which is forbidden the grandees, in the capital; but each of them enjoys a similar prerogative in his own territory. The roofs are adorned with gilt dragons; the columns and ceilings exhibit an elegant display of cedar, camphor-wood, and other valuable kinds of timber; but the whole furniture consists of white mats, adorned with golden fringes.

The houses of private individuals are of wood, painted white so as to have the appearance of stone; the upper story serves as a ward-robe and store-room; the ground floor is in one large apartment, divisible at pleasure into smaller portions by sliding partitions; neither chairs nor tables are used, mats being the only seats; the emperor himself, when he gives an audience to any of his subjects, is seated on a carpet.

Going north-east from Iedo, we find two of the principal towns, Gasima and Namboo. In a south-west direction we have the town of Odowara, where catechu, erroneously called Japan earth, is prepared; Okosaki, with its magnificent bridge; and Kwana, one of the wealthiest in the empire, where there is a strong castle surrounded with water. It is the capital of the fertile province of Owari, which gives its name to a bay.

Miaco, the second city of the empire, is in an inland situation, in a level plain 150 miles[i] south-west of Iedo. It is the principal seat of manufactures and trade. There the imperial coin is struck. It is the seat of the chief priest or *Duïri* with his court of literati, and the place where all the books are printed. Kæmpfer informs us that, according to a census taken in 1674, the population of this place amounted to 405,642 persons, of whom 182,070 were males, and 223,572 females, independently of the numerous court of the Dairi.[k] The vast palace of this Japanese Pope is inaccessible to strangers; but the temples of this holy city have been visited and described. That of Daiboots is the richest building in Japan, though only of wood. The gilt image of the divinity, sitting on a flower like the Hindoo idols, is twenty-five feet[l] broad between the shoulders, and capable of containing several people in the palm of his hand. The pyramidal roofs of the temples and palaces harmonize agreeably with the wooded hills surrounding the city, and from which several limpid rills flow.[m]

The five provinces adjoining to Miaco, reserved for the maintenance of the imperial court, are comprehended under the name of Gokinaï: they abound in rice and vegetables. In one of them, called Sitz or Sidsjow, we find the important city of Osacca, the port of Miaco, and one of the most flourishing cities of the empire. The canals by which it is intersected, and which are crossed by bridges of cedar, remind us of Venice. The pleasures which prevail there, together with the great abundance and easy price of provisions, attract a great many who are in quest of voluptuous indulgence.[n] Fiogo, in the same province, on the Gulph of Osacca, possesses a harbour protected by a very large mole. Mooroo, in the province of Farima, is furnished with a natural harbour. Horses' hides are manufactured into leather at this place in the manner of the Russians.

The towns on the northern and western coasts of the island of Niphon are only known to us by name. The case is the same with those of the whole island of Sikokf, which have not been visited by travellers. In the island of Kiusiu, we distinguish the famous harbour of Nangasaki or Nagasaki, the only one in which foreign vessels are allowed to anchor, this privilege itself being at present confined to the Dutch and Chinese. This place was formerly nothing more than a village, and is indebted to Portuguese commerce for its prosperity and importance. Nangasaki contains eighty-seven streets, each 130 yards[o] long, which is the length legally assigned to a street; the houses therefore may be reckoned at a thousand. When approached by sea, this city presents views which would be sought for in vain in the most celebrated of our picturesque gardens. A rock 238 paces long is the only place in which the Dutch merchants are allowed to reside, where they live in a state of seclusion and solitude worse than monkish, immersed in a total ignorance of the whole world beside.

The isle of Kiusiu, or of Saikokf, which once formed a separate kingdom,[p] still contains the following large towns: Sanga, celebrated for beautiful women, and a manufacture of almost transparent porcelain; Kokura, the place from which they pass to Simonoseki in the isle of Niphon; and Cangoxima, where the Portuguese

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[a] Verhandelingen van't Bataviaasch Genootschaap, V. 566.
[b] Kæmpfer, I. p. 167, (French.)
[c] These principalities are called *kokf*, in the Japanese language.
[d] The empire of Japan is divided into sixty-four provinces. *Bulletin de Ferussac*.—P.
[e] "5 French leagues."
[f] Thunberg, IV. p. 54.
[g] Kæmpfer, II. 271, 344.
[h] Iedo, according to a native plan of the city, is 7 *ris* long by 5 broad. The *lis* of China *(ris?)* is 629 yards; consequently, if this is also the measure of the *ris*, the city is about 2½ miles long by rather more than 1¾ miles broad, or 4403 by 3145 yards.—P.
[i] "54 French leagues."
[k] "Kæmpfer, II. 247.
[l] "4 toises."
[m] Kæmpfer, II. 234, 305, 339, &c.
[n] Kæmpfer, II. 223.
[o] "60 toises."
[p] Kæmpfer, II, p. 6, 201.

landed when they first discovered this country. The islands of Firando and Amakusa had great celebrity at that epoch, from being the first seats of the Christian religion. The isle of Tsusima, between Kiusiu and Corea, forms a principality which was tributary to the Coreans before it became subject to the Japanese. The archipelago of Gotto terminates Japan on the south-west.

To the south, the island of Likeo, which we must not confound with the islands of Lieu-kieu, is separated from Kiusiu by a narrow strait. It is governed by a *daïri* or native pontiff, who is a vassal to the prince of Satsuma. The inhabitants raise two crops of rice in the year. They cultivate their fields to the music of songs accompanied by the lyre. It is separated by Van Diemen's Strait from the island of Tanao-sima, and a chain of smaller islands, extending in the direction of the archipelago of Lieu-kieu.

To the south-east the Japanese empire includes a small archipelago, containing a burning volcano, and traces of several subterraneous fires now extinguished. The most considerable island is called Fatsisio, which is 500 feet[a] high,[b] and steep on all sides; so that it is only accessible by means of ladders of ropes fixed to the tops of the rocks. Here it is said that loose women, who have been disgraced and exiled, weave silk stuffs, according to strange designs dictated by a devious imagination.

The Japanese are well formed, free and easy in their movements, of a hardy constitution, and of middling stature. Their yellowish complexion sometimes inclines to brown, and at others passes into a pale white. The women of distinction, seldom exposing themselves to the air without a veil, preserve complexions equally fair with those of our European ladies. It is by a peculiarity in the eyes that the Japanese are chiefly distinguished. They are farther from a round shape than in any other people: oblong, small, and sunk, they appear as if constantly winking. Their eyelids form a deeper furrow, and their eyebrows are placed a little higher than we generally find them in other nations. They have for the most part large heads, short necks, broad snubby noses, and the hair black, thick, and glossy from being habitually anointed.

In these physical characters we may perhaps trace a mixture of a Chinese with a Mongolian or Mantchoorian race.[c] The Japanese history, after describing a series of gods and demigods, says, that the nation owed the first steps of its civilization to a Chinese colony. Their annals go back to a Chinese monarch called Sin-Moosa. They represent him with the head of a bull, because he taught them agriculture and the management of cattle. But the language of the Japanese, a more authentic document, gives no evidence of any foreign extraction of these islanders. It contains few Chinese terms. It has no resemblance to that of Mantchooria, of Iesso, or of the Kurile islands. The resemblances said to have been found by a learned person between the Japanese and Tartar languages, have long remained without confirmation.[d] The Japanese words are not monosyllabic like the Chinese; the conjugations and the syntax have a distinct and original character.[e] The Japanese or *Yomi* language is employed in poetry and conversation. The bonzes write their theological books in Chinese, which is to them what Latin is to us.

If it is said that the indigenous Japanese have been subjugated by a tribe of Mongols or Mantchoos, who adopted the language of the conquered, at what epoch are we to fix such an invasion? The sacred era of the Japanese goes back to the establishment of the hereditary succession of the *daïris* or ecclesiastical emperors, which was 660 years before the Christian era. This dynasty retained its power till the year 1585 of our vulgar era. In this interval two invasions had been repelled, that of the Mantchoos in 799, the accounts of which are accompanied with many fables. In 1281, the Mongols, under Mangoo Khan, having conquered China fourteen years before, attempted to take possession of Japan. The learned Amiot has given us, in a work translated from the Chinese,[f] the history of that expedition according to the Chinese authors. In this history, the Chinese army, joined to that of the Coreans, amounted to 100,000. The Coreans furnished 900 ships of war; but that great armada was dispersed in a dreadful storm: an event which the Japanese attribute to the protecting care of their gods. All the acquisitions which the population of Japan may have received from the continent of Asia are confined to some colonies of Chinese and Corean emigrants.

The Japanese are probably, like all the principal nations of the world, so far aboriginal that their origin is beyond the reach of history. If they came from the continent, they must have left it previously to the formation of the present languages. They have some obscure accounts that besides their race there were two others in the island of Niphon, the *Mosins* or hairy Kurilians in the north, and a nation of negroes in the south. Perhaps the latter were the Haraforas of the Philippine islands. Many other primitive races, in these insulated regions, may have shone in their day, and, unknown to the rest of the world, have become extinct.

In the year 1128, the *daïri* or ecclesiastical emperor, who is descended from the national gods, was weak enough to appoint a military chief called the *kubo* or *tzioogoon*. The power of this great functionary, consolidated by hereditary succession, grew by victories and by intrigues, till in 1585 the kubo deprived the daïri of the last semblance of political authority. Ever since this revolution, the government of Japan may be considered as an absolute and hereditary monarchy, supported by a great number of subordinate hereditary princes, also absolute, whose submission to the supreme power is secured by their reciprocal jealousies and the hostages which they give. Each prince disposes of the revenues of his own fief or government. By them he defrays the expenses of his court, maintains a military force, repairs the highways, and supplies all the demands of the civil list. The *daimios* or princes of the first degree, and the

[a] "80 toises."

[b] *Fatsi* signifies ten, and *sjo* eight, in the Japanese language.

[c] De Guignes, Histoire des Huns. Gatterer, Manuel d'Hist. Univ. IIe part. Ire Vol. p. 441. Kæmpfer, I. 87, 88. Bayer, Thesaur. epist. La Croz. I. 54.

[d] Thunberg, Observations in linguam Japonicam, in Nov. Act. Upsal. 1792, V. p. 258-273. Hervas, Catalogo de las Lenguas, II. 64.

[e] An introduction to the History of the Nations tributary to China, composed by order of the Emperor Kang-Hi. MS. in the Imperial Library.

siomios who are their inferiors in rank, possess a dignity which is hereditary. The *siomios* are not only obliged to leave their families in the capital, but also to reside there six months in the year.

Travellers admire the Japanese laws. Kæmpfer gives them the preference over those of Europe. Justice is administered in the most expeditious manner. The parties appear in person before the judge, who passes his sentence without delay. But this traveller gives no account of any legal code. He also reduces the value of his authority, by insisting on the pretended advantage arising from the law by which the visits of foreigners are prohibited, and no Japanese is allowed under pain of death to leave his country. According to Thunberg, the laws of this country are few, but executed with the utmost rigour, and without respect of persons; only that the rich, when found guilty, are allowed to get off by paying pecuniary fines.[a] Ordinary offences are punished with death; but the sentence must be signed by the emperor's privy council. The moral education of children being a political duty, parents are rendered accountable for the crimes of those whose early vices they ought to have repressed. The police is vigilant. Not only is there in each town a chief magistrate of police called the *nimban;* but the inhabitants of each street, being accountable in a body for the offences committed by any one of their number, nominate a commissioner who watches over the safety of lives and properties. In each village there is a place surrounded with palisades, containing in the middle an inscription in large characters, consisting of a code of police regulations.[b] It must however be confessed that Varenius, a well informed Dutch writer, gives a less favourable idea of the laws of Japan. The punishments in the seventeenth century were marked with the utmost cruelty. To hack the criminal to pieces, to open his belly with a knife, to suspend him with iron hooks fixed in his sides, or to throw him into boiling oil, were common modes of punishment. The great were allowed the privilege of ripping up their bowels with their own hands.[c] Valentin also describes the legislation of Japan as ferocious and sanguinary. When we are told that crimes are rare in this country, we are not to infer that the laws must be excellent. How can it be otherwise in a country where every citizen is responsible for the offences of his neighbour; and where families and entire villages are visited with the extremity of punishment for the fault of an individual? Such institutions, if they lessen the number of crimes, deprive innocence of its tranquillity, and society of its enjoyments. Would it not be better to run the risk of being robbed once or twice in one's life, than to be every moment in dread of having one's bowels laid open to atone for robberies committed by our neighbours? All that can be said in their favour is, that such terrible restraints may be rendered necessary by the degraded condition of human nature. But allowing the standard of private morals to be the lowest that can be imagined, it is a mistaken notion to suppose that the efficacy of the laws is in proportion to their atrocity. The accountableness of a portion of the community for crimes which the united vigilance of that portion is capable of preventing, is to a certain extent wise and politic, but it ought not to go beyond pecuniary fines; and it is only just where those who are liable in such payments have the exclusive management of the prevention of crimes. Cruelties to those who have forfeited their lives are in all cases to be avoided; and when practised towards individuals who are not the actual offenders, they are sure symptoms of a hideous barbarism, which imagines that the abuse of the members of the community is the best method of insuring a due reverence for the laws.

The accounts of travellers concur in assigning to Japan a prodigious population. Even the mountains, of which this country chiefly consists, are turned to the best account by industrious cultivators; and the *Tokaido*, the principal of the seven great roads of Japan, is sometimes as much crowded with travellers as the streets of any European capital are with passengers.[d] Varenius, following the best authorities,[e] reckons the number of troops kept by the princes and governors at 368,000 infantry, and 38,000 cavalry; and according to the same author, the Kubo or emperor has an army of his own, amounting to 100,000 infantry, and 20,000 cavalry; making in all 468,000 infantry, and 58,000 cavalry. If this statement is correct, we may reckon the population at twenty or thirty millions of souls.

The navy of the Japanese is not worth mentioning. Their vessels are flat in the stern, and incapable of withstanding the waves of a heavy sea; and, though the mariner's compass is used among them as well as among the Chinese, they are very awkward and ignorant sailors. It is indeed hardly conceivable how they could attempt in former times to keep up an intercourse with Formosa, and even with Java, as they are said to have done. Their navigation to the north, according to some Japanese maps, extended as far as the American coast in the neighbourhood of Behring's Straits, which they called Foosang. At present they scarcely venture farther than Iesso; and the inhabitants of that island speak of their voyages to Rakkosima, or "the Country of Sea Lions," which is probably either Behring's Island or Kamtchatka, as the Greeks did of the voyage of the Argonauts.[f]

Varenius has given an account of the revenues of Japan, for each province separately. He makes the sum total 2834 Dutch tons of gold, which, valuing the ton at L.10,000, will be upwards of twenty millions sterling, without reckoning the provinces and towns which depend immediately on the emperor. But these revenues should not be considered as national, being paid in kind to the different princes. The emperor, besides the large revenue of the royal domains and his own provinces, possesses a considerable treasure in gold and silver.

The Japanese are divided into two leading sects of religion, that of Sinto, and that of Budso. The first acknowledges a Supreme Being, who is too exalted to

[a] Thunberg, t. IV. p. 64.
[b] Thunberg, IV. 72.
[c] See the plates of the work entitled "Ambassades des Hollandais au Japon."
[d] Thunberg, t. II. p. 345. III. p. 282 and 318.
[e] Varenius' Description of Japan, c. IX.
[f] Ieso-Ki, d' Arai-Tsikoego, MS

receive the homage of men, or to look after their interests; but they admit as objects of veneration some deities of subordinate rank, to whom they pray as mediators. They maintain that the souls of the virtuous occupy the regions of light adjoining to the heaven of heavens, while the souls of the wicked wander through the air till they have expiated their sins. Though the doctrine of the transmigration of souls is foreign to that creed, the rigid adherents of the Sinto sect abstain from all animal food, abhor the shedding of blood, and will not touch a dead body.[a] They call their gods *Sin* or *Kami*, and the temples *Mia*. These last consist of several apartments and galleries, formed, according to the custom of the country, by partitions which are removed and replaced at pleasure. Straw mats are laid on the floors, and the roofs form on each side a projection sufficient to cover a sort of raised path surrounding the temple, on which the people walk. In these temples no figure is remarked that can be considered as representing the invisible Supreme Being; but they sometimes preserve in a box a small image of some secondary divinity. A large metallic mirror is placed in the middle of the temple, to remind the worshippers that, as every spot on the body is there faithfully represented, the faults of the soul are seen with equal clearness by the eyes of the immortals.[b] The feasts and ceremonies of their worship are agreeable and cheerful, because they consider their deities as beings who take pleasure in dispensing happiness.

The sect of Budso is originally from Indostan, and is the same with that of Budha or Boodh, which is said to have been formed either in Thibet or the island of Ceylon about eight centuries before the Christian era. Spread over Ava, Siam, China, and Corea, this sect adopts some maxims from other religions; but it preserves the doctrine of transmigration. It threatens the wicked with a dreadful hell, where it describes a bridge for souls, abysses of water and of fire, and other imagery borrowed from the alpine regions of Thibet. It also promises to the righteous a paradise of gay fields, houses, and towns, like that of Swedenborg. This paradise, called Gokurak, is ruled by the god Amida. Boodhism is so mixed with the Sinto or old religion of Japan, that it is difficult, and perhaps will become in time impossible, to make any discrimination between the dogmas of the two.

Japan has a set of moralists or philosophers, whose doctrine goes under the name of Sjooto. It has some affinity to that of the Epicureans, although its professors acknowledge, with Confucius, that virtue is the purest source of pleasure. These philosophers believe in the existence of a soul of the world, but do not worship any subordinate deities; they have no temples or religious ceremonies. It has been said that these deists favoured Christianity, and that their number has decreased since the persecution of that religion, as, in order to avoid incurring suspicion, they made a point of offering an ostensible homage to the gods of their country.

From the year 1549 till 1638, missionaries of the order of the Jesuits laboured in propagating their faith. They did not find this nation so ready as many others to embrace a plausible creed, merely because it was urged with earnest importunity. Their conversion could only be effected by arguing with them and resolving their doubts. In these intellectual efforts they obtained in the first instance great success. Several of the governors or tributary kings openly professed Christianity, and in one district the Jesuits obtained the entire prohibition of every other religion. Soon, however, the zeal of the grandees began to cool. They differed materially in one point of practice, viz. polygamy, refusing to part with the numerous trains of wives. The whole missionaries were ordered to leave the country. This mandate not being speedily put in force, the Jesuits remained, but kept themselves extremely quiet. Afterwards some zealous barefooted friars arrived from the Philippine islands, whose open proceedings revived the severities of the government; some of them were crucified, and others had their ears cut off. At the same time a Portuguese vessel having been taken near Orudo, was found to contain a quantity of arms. A strict examination being made, the captain exculpated himself from the imputation of conspiracy; but, being subsequently interrogated by the Japanese officer on the subject of the extensive conquests of the Portuguese nation, of which he had boasted, he said that these were made by sending missionaries, who converted a large proportion of the people, after which an armed force was landed, and, being joined by these converts, soon made themselves masters of the country. The rage of the sovereign Tayoosama then knew no bounds, and a persecution of the bloodiest description was immediately begun. In 1590, 20,000 Christians were put to death; and according to the accounts of the missionaries, the massacre of 1638 involved 37,000. But some cotemporary authors tell us that there were altogether no more than 20,000 Christians in the kingdom.[c] These disasters are, in part, ascribed to the pretensions to power and the political intrigues of the Jesuits, throwing an odium on the religion which they professed. It is very probable that the commercial jealousy which the Dutch harboured against the Portuguese had a share in the bloody proceedings. Ever since that memorable epoch, the Catholic religion has been held in abhorrence in Japan. The missionaries were perhaps too forward in setting fire to the places consecrated to the native worship. It is very probable that, if a band of Japanese missionaries should land at Havre-de-Grace, and set fire to the cathedral of Rouen, the French police would treat them with no small severity.

The civilization of the Japanese seems, like that of the Chinese, to be stationary; but Japan has germs of improvement which offer some possible prospect of a moral revolution. The brave and intelligent Japanese comes nearer to the European, by possessing a more masculine character, and a higher degree of civil liberty. We are told that their learned language is the ancient Chinese, and that their written characters have a still greater resemblance with those of China; but those of the Japanese stand for letters, and not for entire words. The Chinese cannot read a Japanese book; but every well educated Japanese can read the books of China. M. Titsingh, who is now engaged in a great work on

[a] Thunberg, IV. p. 19. [b] Thunberg, IV. p. 21.

[c] Plat. de bono Statu Relig. lib. II. cap. 30.

Japan, has brought with him several printed books which do honour to the skill of that nation. Their types are not moveable, and they print only one side of the paper. This gentleman has in his possession a superb Herbal, drawn and coloured both with taste and accuracy; he has brought maps and plans very handsomely coloured; and which, though they have neither latitudes nor longitudes, will not be without their use in chorography. They have, since 600 years before the Christian era, been in the practice of engraving their money, and the coats of arms of their principal families.[a] The Dutch language is read and spoken in this Asiatic country. Medicine and natural history begin to be taught from Dutch books. Hitherto their physicians have been very ignorant men. Their astronomers adhere to an extremely inconvenient division of time. The year, which is lunar, sometimes begins in May, sometimes in February. Seven times in nineteen years, an intercalary month restores it to the solar course. The schools or colleges, however, seem to be superior to those of any other Asiatic country. Floggings and howlings are not the sounds with which they ring, but solemn songs in honour of their heroes and national gods. Poetry is held in honour. In some arts the Japanese surpass the improvements of European industry. They have excellent coppersmiths, blacksmiths, and armourers. Glass-works are common in Japan, and they even make telescopes; their pictures are loaded with brilliant colours, but in composition and design they are defective.

Their houses, which, on account of earthquakes, have only two stories, would not please the taste of a European, nor would their furniture or their dress; but all these objects evince the industry and ingenuity of the people. Divided into several apartments by moveable partitions, the interior of the house is ornamented with paintings, and gilt and coloured paper; their furniture glitters with a bright and unchangeable varnish; their clothes wide, but tucked up with a sort of elegance, are of substantial cotton and silk stuffs, generally made in the country; they also make their own clasps, buckles, and other trinkets which belong to the female attire, straw slippers, (which are left at the door when they enter a house,) hats of flags[b] which they wear in travelling, and indeed almost every article subservient to their luxury or convenience. The carriages in which their ladies ride seem to be elegant and commodious.[c] They procure a kind of spirit from rice, which they call *saqui* or *zakki*, possessed of a powerful intoxicating quality.[d]

A Japanese is certainly in some respects rather a ludicrous object: his head half shaved; the hair which is left, accumulated on the crown of his head; the enormous covering of oiled paper in which he is wrapped up when he travels; his salutations, which consist in bending his body repeatedly almost to the ground; and the fan which he constantly holds in his hand, present an extraordinary figure. They entertain a high sense of honour, and observe towards each other the most ceremonious politeness; their courtesies and ceremonies are infinite; they have many books teaching how to take a draught of water, how to give and receive presents, and all the other minutiæ of behaviour. Their chiefs are said not so much to resemble our counts and dukes as tributary sovereigns, like those of Arragon and Castile; they are supposed the entire proprietors of the land, part of which they keep for the support of themselves and their families, and divide the rest among their nobles who have vassals under them. The Japanese, proud of the minute cleanliness of his habits, despises the Europeans as a dirty race; he has no idea of our keenness in dispute, and, even when loaded with injuries, does not utter one vehement expression; but his pride is deep, rancorous, and invincible, and the poignard, which is inseparable from his person, is employed as an instrument of vengeance when the object does not expect it, or to destroy his own life in case vengeance is impossible.

The law allows only one wife to the Japanese, but the concubines live in the same house; the wife is at the absolute disposal of the husband; and when she incurs his displeasure she has no appeal. Connubial infidelity is rare among them, although they are subjected to no system of seclusion. In cases of divorce, they are obliged to go constantly with the head shaved. In their marriage ceremonies there is an agreeable simplicity; the woman standing up at the foot of the altar, lights a torch, at which the man lights another; it is also the custom for the young bride to throw the playthings of her childhood into the fire.

The bodies of people of rank when they die are burned, those of others are buried. The festival of lanterns is celebrated as in China, to which is added the custom of visiting the graves at stated times; the manes are regaled with food and drink, and treated with songs and compliments.

The public amusements consist of dramatic entertainments, which are said not to be inferior to those of polished nations; the great number of dancing girls and boys[e] announces the relaxation of public morals, which is also evinced by the great number of infamous houses, which are more scandalously protected here than in any other country.[f]

Inland communication is greatly facilitated by well kept roads; nor are there any duties to interrupt the progress of trade. The harbours, though shut against the commercial enterprise of Europeans, are filled with large and small craft. The shops and markets teem with all sorts of commodities. In the towns there are large fairs, which attract a numerous concourse of people. The Chinese is the most important branch of their foreign trade; they import raw silk, sugar, turpentine, and drugs; they export copper in bars, varnish, and gum-lac. According to Titsingh and Thunberg, the profits of the Dutch trade to Japan are not very considerable; two vessels only are employed in it. The Japanese money is singular in its form. Mr. Titsingh has some pieces in his possession which have a convex

[a] M. Titsingh, quoted by Charpentier-Cossigny in his Voyage to Bengal.
[b] "D'herbe."
[c] Ambassade au Japon, p. 98. 145.
[d] Titsingh, in the "Verhandelingen van het Bataviaasch genootschap
[e] "Des danseuses en grand nombre, et surtout des danseurs plus qu'efféminés."
[f] Kæmpfer, II. 9.

elliptical shape; the gold pieces are called *kobangs;* the silver ones, which are called *kodama*, sometimes have a figure of Daïkok, the god of riches, seated on two casks of rice, with a hammer in his right hand and a bag in his left.[a] M. Titsingh's collection of coins goes as far back as 600 years before Christ.

Such is this singular Asiatic country, too much extolled by the travelling naturalists, as Thunberg, and too much vilified by the missionaries. The former saw there only a magnificent botanic garden; the latter only the stains left by the blood of the martyrs. The description of Varenius and that of Valentine seem dictated by the discontents of the Dutch nation at the time at which they were composed. M. Titsingh, who, while exercising the functions of Dutch resident, conciliated the esteem and confidence of the princes of the imperial blood of Japan, is employed in a large historical, political, and geographical work on this country, which he seems to have studied with greater deliberation and greater zeal than any one before him.

The two chains of mountains which traverse Corea and Japan seem to approach one another, and to be continued along the bed of the sea, so as to form a series of little archipelagos, extending from Japan to the island of Formosa. In this maritime region, which is little known, we find the state of Loo-choo,[b] or Le-queyo. The difference in the orthography arises from this circumstance, that the Chinese letter *k*, similar to the Swedish, has neither the sound of the English *ch*, or *tch*, nor of the French *k;* it, therefore, can only be imperfectly expressed by some combination of our consonants, as *tk*, or *tgh*. This is a very flourishing state, and worthy of engaging our interest. For the first good information on the subject we are indebted to a Chinese ambassador named Soo-pa-koo-ang, who was sent thither in 1719, and from whose writings Father Gaubil the missionary has extracted his account.[c] Kæmpfer had indeed previously mentioned it under the name of the islands of Liquejo, but in an obscure and general manner. A very few years ago, the principal island was visited by two British vessels, which had gone out with Lord Amherst to China, and took the opportunity of making this trip during that nobleman's stay.

According to Gaubil, these islands form, as we have already stated, a sort of chain, or series of little archipelagos, extending from Kiu-Siu, the most southerly of the great islands of Japan, to the island of Formosa; there are in all thirty-six, subject to the same government. To the south of Kiu-Siu, there are seven small islands, and a large one called Tanaxima, belonging to the Japanese empire, and to the south of these, eight others which belong to the king of Loo-Choo; they are called Oofoo Chima, or the islands of Oofoo; the principal one is called Oofoo in the country itself, and Tatao, or "the Great Island," by the Chinese. These islands are fertile and populous, with the exception of Kikiai, which, however, like Oofoo, contains forests of fine large cedars.

On the south-west of these is the great island of Loo-Choo; it is about fifty miles long, and from twelve to fifteen broad. The king resides at its south end, in a palace called Cheoolé, in the neighbourhood of the capital Kien-Ching, which has a seaport named Napakiang, at a distance of five miles; this place was found by the observations made on board the Alceste, to be in latitude 25° 14′ N. and in 127° 52′ 1″ of east longitude; this is its south-west point, the main body of the island extending from this north and a little easterly; all the rocks about it are of coral, and immense masses, often of grotesque shapes, are seen every where along the sea-shore; many of the same nature are found on the higher land, at a distance from the beach, the origin of which may be considered as problematical, and is supposed by some to have been disguised by the action of volcanic fire having raised them to an elevation beyond the reach of the ocean in which they were generated.[d] To the west of this island there are ten others, well peopled and productive, with the exception of Lung-hoang-chau, or "the Sulphur Island," so called from the quantities of that substance which it affords. To the east of Formosa there are seventeen others, all dependent on the King of Loo-Choo.

The natives trace their history back to a period long anterior to the Christian era; but they had no communication with the rest of the world till about the year 605, when they were discovered by the Chinese, who found them the same agreeable and polished people as they now are, though perhaps less on the Chinese model in some particulars than they have since been. The only connection which they have had with their neighbours has been with Japan and China, and even this has been very limited, nor, from what we know of these nations, are they liable to exhibit much change, or likely to have communicated variations of fashion or of habits to others. Gaubil says that Loo-Choo was not subjugated till seven centuries after, or about the fourteenth century, and he adds that before that time the great island was divided into three political communities whence it is called in some maps "the Island of the Three Kings."

The climate of Loo-Choo is one of the most propitious in the world. Refreshed by the sea-breezes which blow over it at every period of the year, it is free from the extremes of heat and cold. The land does not contain those marshes which are so great a source of disease in the warmer latitudes, and the people appear to those who have visited them to enjoy robust health. Nature has been bountiful in all her gifts to that favoured country; such is the felicity of its soil and climate, that vegetable productions, very different in their nature, and generally found in regions very distant from each other, grow here side by side. Not only the orange and the lime, but the Indian banyan, and the Norwegian fir, the tea-plant and sugar-cane, all flourish together. It abounds in rice, wheat, melons, pine apples, ginger, pepper, camphor, dye-woods, wood for fuel, silk, wax, and salt; it also yields coral and pearls. The animals are oxen, sheep, horses, deer, and poultry. Almost the whole animal creation here is of diminutive size, but all excellent in their kind; the bullocks seldom weigh more than 350 lbs. but are plump and well conditioned, and the beef very fine; their goats and pigs are reduced in

[a] Titsingh, Verhandelingen.
[b] Lieu-Kieu.
[c] Lettres Edifiantes, XIV.
[d] See Captain Hall's account

the same proportion, their poultry forming the only exception.

The men are a very small race, the average height not exceeding five feet two inches, but sturdy and athletic; the women are of corresponding stature. They have a good deal of the Corean physiognomy, with increased mildness. They have nothing of the drowsy and elongated eye of the Chinese. The few Chinese and their descendants settled here have no appearance of having freely mixed with the Loo-Chooans, both their features and dispositions being wholly distinct. They shew no mixture of Indian blood, being quite as fair as the southern Europeans; even those who are most exposed are scarcely so swarthy as persons of the same class of society in Spain and Portugal. They are a well-bred and cultivated race. They have a priesthood of bonzes, who are generally educated in Japan. Their books on religion, morality, and science, are in the Chinese character, but, for common purposes, the Japanese letters are employed. Their language differs both from the Chinese and Japanese, though possessing many words in common with both. The emperor Kyang-Hi established a library in the principal island in 1720, and ordered a temple to be built to Confucius. To the latest visitors, the crews of the Alceste and Lyra, this people appeared amiable in the highest degree. The friendliness and cordiality of the respectable persons who composed these crews gave them an opportunity of cultivating a knowledge of their character, and exchanging with them sentiments which did the highest honour to both parties, and appear peculiarly affecting as occurring between races who met from such an immense local distance, and had derived all their ideas from sources which in the lapse of ages had no mutual communication. On such scenes as are depicted in the narratives of Mr. M'Leod, surgeon of the Alceste, and Captain Hall commanding the Lyra, the mind enjoys a most agreeable repose, after having long travelled over pictures in moral and political geography which exhibit so many deplorable instances of the inhumanity arising from unrestrained passions, and from errors which generate antipathies that lacerate in the deepest manner the peace of society. The effect of this moral and social excellence is heightened by the delicious picture which the country, rich by nature, and admirably improved by art, exhibits to the eye, refuting the dogmatism of those who maintain that the abundance of the means of pleasure has an invariable effect in vitiating the heart, and that virtue is nowhere to be found but in scenes in which the scantiness and simplicity of the gifts of nature set limits to the wanderings of human inclination.

"From a commanding height above the ships," says Mr. M'Leod, "the view is in all directions picturesque and delightful. On one hand are seen the distant lands rising from a wide expanse of ocean, while the clearness of the water enables the eye to trace all the coral reefs which protect the anchorage immediately below. To the south is the city of Napafoo, the vessels lying at anchor in the harbour, with their streamers flying; and in the intermediate space appear numerous hamlets scattered about on the banks of the rivers which meander in the valley beneath. Turning to the east, the houses of Kint-ching, the capital city, built in their peculiar style, are observed opening from among the lofty trees which surround and shade them, rising one above another in gentle ascent to the summit of a hill, which is crowned by the king's palace; the interesting grounds between Napafoo and Kint-ching, a distance of some miles, being ornamented by a continuation of villas and country houses. To the north, as far as the eye can reach, the higher land is covered with extensive forests." About half a mile from this eminence, the traveller is led by a foot path to what seems only a little wood; on entering which, under an archway formed by the intermingling branches of the opposite trees, he passes along a serpentine labyrinth intersected at short distances by others. Not far from each other, on either side of these walks, small wicker doors are observed, on opening any of which he is surprised by the appearance of a court-yard and house, with the children, and all the usual cottage-train, generally gamboling about; so that, while a man fancies himself in some sequestered retreat, he is in fact in the middle of a populous but invisible village.

They found many of these islanders persons of great intelligence and address. One individual was particularly characterized, whose name was Madera, a man of rank and influence in the government, who came on board in the disguise of a person of mean condition, for the purpose of learning the character and intentions of these visitors, and gradually and frankly unfolded his real character in proportion as his confidence in this respect increased. A series of anecdotes is related, showing his aptness in acquiring both the language and the ideas of the English. He delighted in receiving information; and his remarks were always pertinent. The map of the world, with the track of the ship across the various oceans, from Britain to Loo-Choo, with the different intervening continents and islands, when pointed out, he and others traced with great care, and seemed at last to comprehend, though such objects were entirely new to them, and though they appear to have had no idea of the figure or vast extent of the globe. Madera was gay or serious as occasion required, but always respectable, and all his countrymen seem to be gifted with a sort of politeness which might be fairly termed natural, having in it nothing constrained or studied.

Table of Geographical Positions observed on the Coasts of Mantchooria, Iesso, Japan, and Corea.

Places.	Lat. N.	Long. E. from London.	Observers.
	deg. min. sec.	*deg. min. sec.*	
SEGHALIEN.			
Cape Elizabeth . .	54 20 0	142 45 15	Krusenstern.
—— Golowatchef .	53 30 15	141 55 15	Idem.
—— Patience . .	48 50 0	144 45 15	Idem.
—— Amwa . . .	46 2 20	143 30 35	Idem.
Idem	46 3 0	143 29 0	La Perouse, as corrected by Dagelet.
Idem	. . .	144 40 15	Chart of La Perouse's Voyage, (an error in the chronometer.)
Cape Crillon . . .	45 54 0	142 55 15	Krusenstern's Chart, (La Perouse. Connais. des Temps.)
Idem	45 54 15	141 58 54	La Perouse, corrected by Dagelet.
KURILES.			
Canal of Nadeshda, near the peak Saryt-chef	48 2 0	152 52 51	Krusenstern.
IESSO.			
Cape Soya . . .	45 31 15	141 51 15	Idem.
—— Romanzof . . (Notzamboo.)	45 25 50	141 34 45	Idem.
Island of Riosheri or *Pic de Langle.*	45 23 0	142 10 15	Chart of La Perouse. (Error.)
Idem	45 10 48	141 22 5	La Perouse, as corrected by Dagelet.
Idem	45 11 0	141 12 30	Horner and Krusenstern, (repeated and accurate observations.)
Cape Malespina . .	45 42 15	141 18 45	Idem.
—— Novoilzof . . (Okomoov.)	43 11 0	140 13 45	Idem.
Island of Okosir (middle)	42 9 0	139 30 15	Idem.
Cape Nadeshda . .	41 25 10	140 9 45	Idem.
Volcano Bay . . .	42 33 11	140 52 47	Broughton.
JAPAN.			
Cape Songaar . .	41 16 30	140 14 15	Krusenstern.
—— des Russes . .	39 50 0	139 44 15	Idem.
—— Noto . . .	37 36 0	137 54 15	Connaiss. des Temps.
Island of Tsus (N. point)	34 40 30	129 29 45	Krusenstern.
Nangasaïki . . .	. . .	. . .	
Cap d'Anville . .	. . .	. . .	
——Namboo . . .	. . .	. . .	
COAST OF MANTCHOORIA AND COREA.			
Cape Romberg . .	53 26 30	141 45 0	Krusenstern.
Castries' Bay . .	51 29 0	141 59 15	La Perouse. Connais des Temps.
Cape Monti . . .	50 30 0	141 53 15	Idem.
Suffren's Bay . . .	47 53 0	139 40 15	Idem.
Bay of Ternay . .	45 13 0	137 29 15	Idem.
Isle of Dagelet . .	37 25 0	131 22 15	Idem.
Tsa-Choni (Corea) .	35 30 0	129 43 15	Idem.
Quelpaert (Island) .	33 7 49	126 18 57	Idem.

N. B. The Table of the 68 provinces and 600 political subdivisions of Japan are omitted as of inferior importance, in order to leave room for more interesting materials.

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BOOK XLII.

CHINA.

PART I.

General description of the Country.

Several circumstances relative to the Chinese are even in our history of geography. There the question is considered which has been agitated among geographers,[a] whether that people was known to the ancients. We trace the progress of the Arabian travellers of the ninth century, and the missionaries of the thirteenth, as well as the celebrated Marco Polo, in their respective travels to Cathay or *Kithay*, and to Mangi, or Maha-Tchin, or, in other words, northern and southern China. On this account, these discussions will not now detain us. We shall merely mention that the travels of Rubruquis and Marco Polo remained for a long time almost unknown, and that the learned Pope Pius II., in 448, described China only from a very short account of Nicholas Conti, who had visited it half a century before, and whose veracity the Pontiff seems to doubt.[b] It was only by means of the Portuguese navigators who succeeded Vasco de Gama, that Europe received any certain information of the situation, extent, and splendour of China. Since that period, we owe our knowledge to some ambassadors who have seen the court and the great roads, to some merchants who have inhabited a suburb of a frontier town, and a considerable number of missionaries who have penetrated in every direction, and who, being considered as credulous admirers, though artless narrators, inspired little confidence in their judgment, so that the world was left to guess at the truth of numerous facts which these well meaning persons were ill qualified to appreciate. We have also some Chinese geographers, whose dry tables of nomenclature give us little information. Thus any extended description of China that could be given would consist of a series of repetitions.

The conquests of the Emperors of the Mantchoo (called very improperly the Tartar) dynasty, have extended their power over a great part of the countries which used to be called Independent Tartary, but which were inhabited by Kalmuks and Mongols, races of men wholly distinct from the Tartars. The Russians at the same time advanced into Siberia. The centre of the old continent became a point of mutual contact for two nations proceeding in opposite directions from its two opposite extremities. Two great empires, the Russian and the Chinese, the one of which approaches the pole while the other passes the tropic, and which appeared to have the whole world intervening, find themselves conterminous on a line extending 3000 miles[c] in length, from the neighbourhood of lake Palcati to the mouth of the river Amur. This long mutual frontier follows in general the direction of the Altaian, Sayanian and Daurian mountains. In Dauria, however, the Russians have extended their boundaries beyond the mountains to the banks of the Amur. Lake Palcati, the Alak mountains, and the Belur mountains, separate the Chinese empire on the west from the Kirghis, the Uzbeks, and the other independent races of true Tartary. While the Chinese power gradually reached the frontier of Asiatic Russia on the north and north-west; it extended to the west and south west over the vast regions of Thibet, and has now become almost conterminous with the British possessions to the north of Bengal. The small countries of Sirinagur, Nepaul, &c. and the Garrow mountains, the last barrier on this side between the Chinese empire and India, are now partly under the protection of Great Britain. More to the east, the Chinese province of Yunnan comes in contact with the Burman empire. The possessions of the Siamese do not reach the Chinese frontier; but the little kingdoms of Laos and Tonquin are its nearest neighbours[d] in that quarter, and perhaps tributary to it.

The Eastern Ocean, forming many gulphs and straits, washes the shores of the Chinese empire for an extent of 3,600 miles,[e] reckoning from the Tonquinese frontier to the mouth of the river Amur. The Gulph of Tonquin and the Chinese Sea bound this empire on the south. The channel of Formosa separates the island of that name from the continent. The Blue Sea extends between China and the islands of Loo-Choo and Japan; the Yellow Sea between China and Corea. We have already considered the Sea of Japan, the extremity of which, explored by La Perouse, has received the inappropriate name of the Channel of Tartary. It is not certain whether the Chinese lay claim to the island call-Seghalien or Tchoka, a country which may acquire some importance, and of which the more active ambition of the Russians will perhaps take possession. The extremity of the Mantchoo country, which has been called Chinese Tartary, lies on the sea called by modern navigators the Sea of Okhotsk, and by D'Anville the Sea of Kamtchatka.

The Chinese empire, comprehended within these

[a] See the note at p. 368 of this volume.
[b] Pii Papæ, II. Asia, cap. 15. [c] "Nearly 1100 Fr. leagues."
[d] "Limitrophes," conterminous, bordering on.
[e] "1300 Fr. leagues."

limits, has a length of about 3,460 miles,[a] reckoning from Cashgar to the mouth of the Amur. Its greatest breadth may be taken from the Sayanian mountains to the southern point of China, opposite to the island of Hainan, a line of more than 2,000 miles.[b] Its surface may be computed at seven millions of square miles,[c] somewhat less than a tenth part of that of the habitable globe.

In the present book we confine ourselves to China Proper. This country presents in itself a field of very great extent, having a surface of more than 537,000 square miles,[d] inhabited by a population which some reckon 150, and others, 333 millions. This country has, indeed, no natural limit; the Great Wall separates it from the Mongols on the north; on the west, political limits are prescribed to the wanderings of the Kalmuks, or Eleuts of Hoho-Nor, and the Sifans; on the south, the frontiers of China Proper are the same with those of the empire.

The following is the table of division and extent of China Proper, according to the information communicated by the Mandarin Chow-ta-sing to Lord Macartney, when on his embassy from Great Britain.

Provinces.	Square Miles.	Acres.
Pe-tche-li	58,949	37,727,360
Kiang-nan. Two provinces.	92,961	59,495,040
Kiang-si	72,176	46,192,640
Tche-kiang	39,150	25,056,000
Fo-kien	53,480	34,227,200
Houquang { Hou-pé. Hou-nan	144,770	92,652,800
Honan	65,104	41,666,560
Shan-tong	65,104	41,666,560
Shan-si	55,268	35,715,520
Shen-si { Shen-si proper Kan-tchou	154,008	98,565,120
Se-shuen	166,800	106,752,120
Quang-tong	79,456	50,851,840
Quang-si	78,250	50,080,000
Yun-nan	107,969	69,100,160
Kœit-cheou	64,554	41,314,560
	1,297,999	830,719,360

This country has been celebrated under more than one name; the inhabitants call it Tchon-Koue, or "the centre of the world;" for the Chinese, in their overweening pride, consider other countries as mere stripes surrounding their own territory. The accounts of the Mahometan travellers of the ninth century, published by Renaudot, give southern China the name of *Sin*, pronounced by the Persians *Tchin*. The origin of this name is uncertain; and though the *Sinæ* of the ancients were situated more to the west than any part of modern China, the resemblance of the names is too great to allow it to be considered as unmeaning. It is highly probable that it was the ancient generic name for all the nations of Thibet, China, and India, east of the Ganges.

Doubts no less difficult to solve render the physical geography of China less interesting than that of so great a country ought to be. It seems to contain two mountainous regions, one in the south-east, and the other in the north-west.

The great southern chain is known as far west as between the provinces of Yun-Nan and Kœit-Cheou. It is not ascertained whether it is continued from the mountains of Thibet or not. This chain extends between the provinces of Quan-Si, Quan-Tong, and Fo-Kien on the south, and Hou-Quang, and Kiang-Si, on the north; it runs first from west to east, and, after reaching the limits of Fo-Kien, turns to the north-east; thus it separates the basin of the Yang-tse-Kiang, first from that of Hon-Kiang on the south, and then from the sea on the east. Two branches of this chain cut the basin of the Yang-tse-Kiang transversely, so that the three provinces of Se-Tchuen, Houquan, and Kiang-Si, should stand the one at a higher level than the other, and form as it were three terraces. The principal chain must be difficult of approach, especially in the provinces of Kœit-Cheou and Quan-Si, since there are some savage races in that quarter whom the Chinese have not been able to subdue; but travellers have only examined the little mountain of Meiling, which rises 3,000 feet above the level of the lake Po-yang.[e] It is surrounded by several other less elevated mountains, the precipices of which, covered with trees and large plants, present a view in the highest degree wild and romantic. Gneiss and quartz seem to be the prevailing rocks in this mountain chain, called the Mangian, from *Mangi*, the name of southern China, and which rivals the Apennines, or perhaps the Pyrenees.

The mountainous region of the north-west does not so much consist of regular chains as a succession of terraces or table lands. Such at least they are represented in the maps of D'Anville, in which a trace of mountains faintly delineated conveys the idea of great exactness and fidelity. In the west of the province of Se-tchuen a chain of mountains runs parallel to the river Yalon from south to north, and then enters the Sifan country, where it takes the names of Kentac-la, Rhat-ci-co, and others. From this region, rich in springs, the chain turns to the east, and enters the province of Shen-si, where it runs parallel to the river Hoei-ho, then to the Hoan-ho. It gradually disappears in the province of Ho-nan. In the north of the province of Shen-si, and in the country of the Ortosh Mongols, the Hoan-ho is found to make a turn of 800 miles[f] to the north, and bounds on three sides a mountainous and perfectly isolated plateau.

The province of Shan-si is full of mountains, which seem to belong to a chain extending from the banks of the river Amur across Mongolia. The secondary branches of this chain have been explored by Dr. Gillan. The mountains are almost all perpendicular, and present bare rocks in every part. Most commonly the first terrace is of vitrifiable sand-stone; the second is a coarse granulated lime-stone, filled with bluish nodules; the third is of great thickness, and very irregular, formed of a hardened clay of a blue colour, and sometimes

[a] "1250 Fr. leagues."
[b] "750 Fr. leagues."
[c] "650,000 square Fr. leagues."
[d] "194,000 square Fr. leagues."

[e] Macartney's Embassy. Barrow, t. III. p. 29, 122. De Guignes, t. 1. p. 162.
[f] "Nearly 300 Fr. leagues."

of a brownish red.[a] In some places there is a large quantity of oxide of iron, giving the clay an appearance of ochre. In several parts adjoining Mongolia, there are perpendicular veins of white spar, sometimes mixed with blue. The tops of the highest mountains contain in different places large masses of granite.[b] [c]

These mountains offer no traces of the agency of fire. They seem to have been formerly covered with wood; at present their summits, and the parts which are most exposed, exhibit none except stunted vegetable productions.

The province of Shan-ton consists in a great measure of a large mountainous peninsula. These mountains, which contain coal mines, constitute a group wholly detached from the other mountains of China. The five most elevated peaks of the chain are called by the Chinese "the Horses' Heads."

The largest plains of China are those found in the province of Kiang-nan, between the two great rivers Hoan-ho and Yang-tse-Kiang. These two rivers, with the Hou-kiang in the south, form three great basins, which comprehend the most fertile parts of the country. The coasts of China seem in general to be rocky, sandy, and beset with shallows.

Hoan-ho, or "the Yellow River,"[d] receives this name from the colour of the mud which it carries along. Its known sources are two lakes situated in the country of the Kalmuks of Hoho-nor, called also the Choshots. But according to D'Anville there is a river which flows into the most westerly of these lakes, which is entitled to be considered as the *commencement* of the Hoan-ho. Its origin is thus similar to those of the Rhone and the Rhine. Geographers make difficulties about these points regarding the origins of great rivers, as if science and truth were in danger from an error, forgetting that they are mere questions of nomenclature, and that the only object worthy of pursuit is to have one brief mode of speaking, judiciously chosen and sufficiently steady to be always understood. Where this is not the case, every end is obtained by specifying the fact in particular cases, as we have now done.

The Yang-tse-kiang, or "Blue River," rises somewhere in the north of Thibet, near the Desert of Cobi. But it is only by forming reasonable though uncertain conclusions from a number of contradictory accounts, that D'Anville and Arrowsmith have fixed the positions of these sources.

These two great rivers, similar both in rise and destination, descend with rapidity from the great table lands of Central Asia, and each of them meets a branch of mountains which forces it to describe an immense circuit, the Hoan-ho to the north, and the Yang-tse-kiang to the south. Separated by an interval of 1100 miles,[d] the one seems inclined to direct itself to the tropical seas, while the other wanders off among the icy deserts of Mongolia. Suddenly recalled, as if impelled by the remembrance of their early brotherhood, they approach one another, and wind along together like the Euphrates and Tigris in another Mesopotamia; where, after being almost conjoined by canals and lakes, they terminate within a mutual distance of 110 miles[e] their majestic and immense course.

Among the tributaries of these two great rivers, there are some which equal in size the largest rivers of Europe. The Fuen-ho, the Hoei-ho, and the Hoay-ho, fall into the Yellow-River; the Yalon-kiang, which is nearly 700 miles[f] long, the Tchoue or Yan-kiang, the La-kiang, and the Yuen-kiang, are tributaries to the Blue River. The two rivers Yuen and Yon run first into the lake Tonting-hou, and the Kan into the lake Po-Yang-hou, and these two lakes then send their waters into the Yang-tse-kiang. Each of these secondary rivers of the interior of China may be compared to the Loire, the Rhine, or the Elbe.

There are, however, two large rivers in China, which maintain a perfect independence both of the Hoan-ho and the Yang-tse-kiang. The Hoan-kiang,[g] in the south, descending from the mountains of Yun-nan, after a course of 740 miles,[h] falls into the Gulph of Canton; and in the north the Pay-ho,[i] after receiving the Yan-ho, falls into the Gulph of Pekin. This multitude of rivers confers on the Chinese nation incalculable advantages for agriculture and inland navigation. But their water is seldom of a good quality for human use, probably because in their rapid descent from the steep mountains they carry along with them a quantity of foreign particles, and afterwards wind too slowly through the marshy flats.

Some parts of China are filled with lakes, several of which are very large. Duhalde tells us that the lake of Tong-ting-hou, in the province of Hou-quang, is more than 220 miles[k] in circumference. From the borders of this lake to the city of Vou-tchan, on an area of 140 miles[l] long and broad, there is a great number of lakes almost touching one another. This circumstance has procured for the province its name Hou-quang, which signifies "the Country of Lakes." The lake Po-yang-hou, in the province of Kiang-si, has a circumference of 90 or a hundred miles,[m] and receives four superb rivers, one of which is fully equal to the Loire at Angers. The navigation of that lake, however, is dangerous. The Tai-hou, a lake south from Nankin, is surrounded by very romantic hills. Those of Hontse-hou and Kaoyeu-hou, to the north of Nankin, are of vast extent. All these lakes furnish intermedia of communication, and resorts for pleasurable excursions, and are abundantly stocked with fish.[n] In these tranquil basins barks are navigated which are light enough to be perfectly portable; and the Chinese pelican, an aquatic bird, is trained for catching fish, a ring being fixed round his neck to prevent him from swallowing his prey.[o]

The Chinese have displayed their enlightened industry

[a] Probably a succession of transition sand-stone and limestone, and grau-wacke.—P.

[b] "Masses de granite eparses," scattered masses of granite; probably bowlders.—P.

[c] Macartney's Embassy, III. 207, 246, 259. Barrow, II. 241.

[d] "400 Fr. leagues." [e] "40 Fr. leagues."

[f] "250 Fr. leagues."

[g] Called Hon-Kiang, p. 398, and Hou-Kiang, in a previous part of this page.—P.

[h] "270 Fr. leagues."

[i] Pei-ho.

[k] "80 Fr. leagues."

[l] "50 Fr. leagues."

[m] "30 or 40 Fr. leagues."

[n] Barrow, III. 12. II. 387—391.

[o] Anderson's Narrative of Lord Macartney's Embassy v. 277 Shaw's Naturalist's Miscellany, No. 154. Duhamel, Traite des Pêches, sect. III. ch. I. p. 17.

in uniting by numerous canals all the waters with which nature has so largely endowed their empire. Travellers are astonished at the length and commodiousness of these canals. They are deep enough at all seasons to carry large vessels.[a] But their locks, or rather their perforated dykes,[b] by means of which vessels ascend and descend, are constructed with very little skill.[c] The rivers and canals are covered with so great a number of vessels loaded with all sorts of provisions, that the waters seem to have on their surface as large a population as the land. The canals have a stone quay all along their margin, and sometimes bridges constructed with wonderful art: but the navigation is slow, because the vessels are generally dragged by men. These numerous water-courses,[d] the rocks, the woods, the fields, and the quick succession of villages, render China a country highly pleasing to the eye, the wonders of nature being conjoined with those of human industry. The most celebrated of these canals is that called the Imperial Canal, forming a communication between Pekin and Canton, about 1660 miles[e] long. It was built in the end of the thirteenth century, under the grandson of Genghis-Khan. The only interruption of this long navigation is a distance of one day's journey in crossing a mountain between the province of Quantong and that of Kiang-si.[f]

The difference of climate between the different provinces is increased by the influence which the mountains of Central Asia necessarily exercise, the cold of which often diffuses itself over the adjoining countries. On the other side, the proximity of an immense ocean must modify in a particular manner the climate and seasons of the maritime provinces.

The hurricanes to which the island of Formosa is exposed, often extend their ravages over the adjoining shores of China. Chinese history has committed to record the storm which destroyed the immense fleet destined for the conquest of Japan. The dreadful water-spouts and whirlwinds which make their appearance in the Gulph of Tonquin also infest the Chinese Sea.

The south of China, near the tropic, experiences heats greater than those of Bengal, but moderated by the monsoons or periodical winds. The mean heat of Canton is about 76° of Fahrenheit's scale.[g] The great trade wind blowing from east to west does not seem to reach the southern coasts of China, or if it does, it is only in an indirect and inconstant manner. The accounts given of the monsoons by navigators seem full of contradictions; the north-east winds appear to prevail in spring and summer, and the south-west and south in the fall; but both of them are liable to frequent changes.

The northern and western parts of China have a far colder climate than the countries of Europe which are situated in the same parallel of latitude. The elevation of the land, and the snows with which for the greater part of the year the central mountains of Asia are covered, contribute to produce this difference of temperature.

The extremes of heat and of cold are much greater at Pekin than at Madrid, though the latitude is much the same; it freezes daily in December, January, and February, and very often in March and November. The cold is speedily followed by excessive heat. At Pekin there are, properly speaking, only two seasons, winter and summer. Calculating according to the observations of Father Amyot,[h] the mean term of the greatest heat is 102°;[i] that of the greatest cold 8°;[k] the difference 94°;[l] the medium heat of the year 55°.[m]

The winds are often extremely violent at Pekin. In spring and autumn they begin at sunrise and cease at sunset; they often carry along with them a copious impregnation of yellow dust resembling a shower of sulphur, which is probably the pollen of the flowers of the pines and firs that grow in the neighbourhood of Pekin. The north and south-west winds are the most prevalent.

Rain is rare in Pekin during winter. Nothing but snow falls at that season, and that in small quantity. The months of June, July, and August, are very rainy; November is the driest month of the whole year. Fogs are frequent in December and January. The average number of rainy days throughout the year is fifty-eight. At Pekin auroræ boreales are frequently seen; and several other luminous appearances, which seem to be of the same nature, occur during the day.

While entering on a view of the vegetable riches of China, the treasures of an excellent agriculture arrest our attention. The principal object of cultivation is rice; but in the north-west there are places too cold and dry for this grain, which is therefore replaced by wheat. Yams, potatoes, turnips, onions, beans, and, above all, a species of white cabbage called *petsai*, are cultivated in this country.[n]

Almost the whole arable land is constantly employed in the production of human food. The practice of fallowing is unknown. There are very few pastures, and few fields of oats, of beans, or of turnips for feeding cattle. Even the steepest mountains are brought into cultivation; they are cut into terraces, resembling at a distance immense pyramids divided by numerous steps or stories; and, what is most worthy of our admiration, the water which runs at the foot of the mountain is raised from terrace to terrace to the very top, by means of a portable chain pump which may be carried about and worked by two men. Reservoirs are also dug on the tops of the mountains, from which the rain water that is collected is let down by a variety of gutters for the irrigation of the sides. In such places as are too steep or too barren, pines and larches are planted.[o]

The plough is on a very simple construction; it has only one handle, or hilt, and no coulter. As they do not fallow their ground, and have no turf to cut, the coulter is considered as useless. They sow their corn neatly in drills formed by the drill plough, a method lately tried

[a] "Bateaux." [b] "Digues percées." De Guignes, II. 33, 35, 195. Macartney, IV. 171.
[d] "Ces nombreux filets d'eau."
[e] "600 Fr. leagues."
[f] Duhalde, I. 33. Macartney, &c.
[g] Kirwan on Temperature and Climate.
[h] Mémoires des Sçavans Etrangers, t. VI. p. 509.
[i] "+ 31° Reaum."
[k] "— 10.6° Reaum."
[l] "41° Reaum."
[m] "+ 10.1° Reaum." [n] De Guignes, III. 326.
[o] Macartney, IV. 210. Pl. XXXVI. De Guignes, I. 288. III. 335.

in some parts of England. The drill plough employs the women and children of the farmers. The Chinese sometimes use a large cylinder to separate the grain from the ear; they have always practised winnowing with a machine precisely similar to the fanners which were introduced into Europe about a century ago.[a]

The animals employed for agricultural labour and for carriage, as well as those intended for food, are generally kept in stables, and the fodder is collected for them. Horses are chiefly fed on beans and finely chopped straw. In the northern provinces oxen are used for the plough, as it is too cold for the buffalo; but the latter is preferred wherever the climate admits of it. No substance susceptible of putrefaction escapes the patient industry of the inhabitants in the preparation of manure. The different expedients to which they have recourse for the collection and improvement of that valuable article are numerous; but a description of the details is not necessary, and, in a work of this sort, would be repugnant to good taste.

The manner in which the dwellings of the peasantry are disposed, contributes to the flourishing state of agriculture. They are not collected in villages, but all dispersed. They use no fences, nor gates, nor any precautions against wild animals or thieves. The women raise silk worms; they spin cotton, which is in general use among the common people for persons of both sexes; they also manufacture their stuffs. The women are the only weavers in the empire.

Every one has heard of the honours conferred on agriculture by the Chinese government. Every year, on the fifteenth day of the first moon, which generally corresponds to some day in the beginning of our March, the emperor in person goes through the ceremony of opening the ground. He repairs in great state to the field appointed for this ceremony. The princes of the imperial family, the presidents of the five great tribunals, and an immense number of mandarins, attend him. Two sides of the field are lined with the emperor's officers and household, the third is occupied by different mandarins; the fourth is reserved for all the labourers of the province, who repair thither to see their art honoured and practised by the head of the empire. The emperor enters the field alone, prostrates himself, and touches the ground nine times with his head in adoration of *Tien* the God of heaven. He pronounces with a loud voice a prayer prepared by the court of ceremonies, in which he invokes the blessing of the Great Being on his labour and on that of his whole people. Then, in the capacity of chief priest of the empire, he sacrifices an ox, in homage to heaven as the fountain of all good. While the victim is offered on the altar, a plough is brought to the emperor, to which is yoked a pair of oxen, ornamented in a most magnificent style. The prince lays aside his imperial robes, lays hold of the handle of the plough, and opens several furrows all round the field; then gives the plough into the hands of the chief mandarins, who, labouring in succession, display their comparative dexterity. The ceremony concludes with a distribution of money and pieces of cloth as presents among the labourers; the ablest of whom execute the rest of the work in presence of the emperor. After the field has received all the necessary work and manure, the emperor returns to commence the sowing, with similar ceremony, and in presence of the labourers. These ceremonies are performed on the same day by the viceroys of all the provinces.

It must, however, be acknowledged, that creditable travellers have represented the state of Chinese agriculture as far less flourishing than is generally represented. On the road from Pekin to Canton there are extensive tracts in a state of nature, arid mountains which are susceptible of no sort of culture, and heaths of an aspect as gloomy as those of Brittany. The western provinces, according to the accounts of the Chinese, contain a still larger extent of barren land.[b]

The Chinese have many fruit trees, but in that article their industry is far behind. Wedded to old habits, they have added little improvement to the species as furnished by nature. Their finest fruits are in general far inferior in flavour to those of Europe. They do not practise grafting. They pay very little attention to the making of wine, though several provinces of the empire abound in vines, the grapes of which are chiefly sold in the form of dried raisins. Among the fruit trees of China we may remark our lemon tree and the *Citrus Chinensis*, three kinds of oranges, among which that called *kammat* is of the size of a cherry, the Chinese chesnut,[c] the banana, the tamarind, the mulberry, and the guava, bearing a fruit similar to the pomegranate. Several European fruits, such as gooseberries, (raspberries, according to some,) and olives, are hardly known in China. Cabbage, turnips, and potatoes, form a great part of the food of the Chinese, and the culture of these vegetables is carried to a high degree of perfection.

But nature has conferred on China other treasures which are peculiar to that country. Tea, which has now become an article of the first necessity for more than one nation of Europe, brings immense profits to the Chinese. The *Thea viridis* or green tea, and the *Thea Bohea* or black tea, have been generally considered as trees of different species; but some able botanists, and, among others, Messrs. Ventenat and Cels, have thought that the tea tree is a single species, only subject to varieties. Sir George Staunton also thinks that the green and the bohea tea grow on the same shrub, but that the latter undergoes some preparation which deprives it of its powerful agency on the system, and communicates to it a deeper colour. De Guignes tells us that green and black tea differ in their origin: that the one is the produce of the province of Kiangnan and the other of Fokien. Black tea has not the corrosive quality of green tea.[d] Other species, as imperial, congo, and singlo, have got these names from the nature of the soil, or the names of the districts which produced them. A particular odour is communicated to tea by mixing it with the leaves of the sweet-smelling olive.[e] The tea shrub does not prosper in the best

[a] Barrow, III. 66. De Guignes, I. 348. II. 17. III. 339.
[b] Mémoires sur la Chine, VIII. p. 295. Duhalde, t. I. p. 14, 15. Lettres édifiantes, XXII. p. 177. (Compare Macartney, IV. 471.)
[c] "Marronier de Chine," horse-chesnut.
[d] P. Lecompte, Mémoire sur l'état présent de la Chine, I. lettre 8, p. 368. De Guignes, III. 244, 247, &c. Macartney, IV. 192. Barrow III. 79.
[e] Olea Fragrans.

manner any where except in the space bounded by the Gulph of Canton on the south, and the Yang-tse-kiang on the north, which lies between the parallels of 30° and 23°. Farther north and farther south the cultivation of it is less advantageous.[a]

The camphor tree grows to a size which entitles it to be numbered among trees, and it furnishes some of the handsomest and best wood for carpentry. The branches alone are used for preparing the drug known under the name of camphor. The bark of the paper mulberry is used for making cloth and paper. From the fruit of the *Croton sebiferum* or tallow tree, a green coloured wax is obtained which is formed into tapers. The Chinese varnishes are in great reputation. They are made of a gum which is obtained by incision from a tree called in the Chinese language *shi-shu*. The *aloe-tree* has the height and figure of an olive tree. It contains within the bark three sorts of wood; the first, black, compact, and heavy, is called eagle wood; it is scarce; the second, called Calambouc, is light like rotten wood; the third, near the centre, is called Calamba wood, and sells in India for its weight in gold. Its smell is exquisite; it is an excellent cordial in cases of fainting or of palsy. The bamboo grows in marshy places. Its stems are applied to a great many uses, on account of their lightness. While young, they are cut and split for matting. When old, they acquire a hardness equal to that of the strongest building timber. Their fibrous part is made into paper. The sugar cane grows in the south of China, and sugar is one of the commodities which the Europeans export from that country. The case is the same with indigo. The crops of cotton are equally abundant. But cinnamon, clove, and nutmeg trees, are in small number, and confined to the southern extremity of the country.

Arrow-root, galanga, sarsaparilla, and rhubarb, are numbered among the articles of export, but the rhubarb probably comes from Mongolia and Thibet.

In the maritime provinces of China no large forest is to be seen in the plains, but several on the mountains. There are some of immense extent in the western part of the country. Pines and larches are very common. The weeping willow, the Indian fig, the *Thuia orientalis* or *Arbor vitæ*, the *Hibiscus mutabilis*, and many other trees and shrubs, form little groves, or grow detached in places not subjected to agriculture.

The Chinese rear, though in comparatively small number, all the domestic animals of Europe, the horse, the ass, the ox, the buffalo, the dog, the cat, the hog; but their horses are small and ill-formed. The camels of China are often no larger than our horses; the other breeds are good, and particularly that of hogs. The kind of dog most common in the south from Canton to Tong-chintchen, is the spaniel with straight ears. More to the north, as far as Pekin, the dogs have generally hanging ears and slender tails.

Elephants are common in the south of China, and extend as far as the 30th degree of north latitude in the provinces of Kiangnan and of Yun-nan. The unicorn rhinoceros lives on the sides of the marshes in the provinces of Yun-nan and Quan-si. The lion, according to Duhalde and Trigault,[b] is a stranger to China; but the animal figured by Neuhoff, under the name of the tiger,[c] seems to be the maneless lion known to the ancients, described by Oppian, and seen by M. Olivier on the Euphrates. Marco Polo saw lions in Fo-kien: there were some at the court of Kublai Khan.[d] The true tiger probably shows himself in the most southerly provinces, where there are also various kinds of monkies, the long-armed gibbon or *Simia longimana*, the *Simia influens* or ugly baboon, and the *Simia silvanus* which mimics the gestures and even the laughter of men. The musk animal, which seems peculiar to the central plateau of Asia, sometimes descends into the western provinces of China. The deer, the boar, the fox, and other animals, some of which are little known, are found in the forests of China.

Tame poultry abounds in China, particularly ducks. They are seen wandering in whole flocks on the canals, and in the evening their owners call them home with a whistle. Several of the birds of the country are distinguished for beauty of form and brilliancy of colour; such as the gold and silver pheasants, which we often see painted on the Chinese papers, and which have been brought to this country to adorn our aviaries; also the Chinese teal, remarkable for its two beautiful orange crests. The insects and butterflies are equally distinguished for their uncommon beauty. Silk worms are common, and seem to be indigenous in the country. From drawings made in China it appears that it possesses almost all the common fishes of Europe; and M. Bloch and M. de Lacepede have made us acquainted with several species peculiar to it. The Chinese gold-fish, which in that country as with us is kept in basins as an ornament, is a native of a lake at the foot of the high mountain of Tien-king, near the city of Tchang-hou, in the province of Tché-kiang. From that place it has been taken to all the other provinces of the empire, and to Japan. It was in 1611 that it was first brought to England.

Silver mines are abundant in China, but are little worked; perhaps the ignorance of the Chinese is the cause of that circumstance. Gold is chiefly obtained from the sand of the rivers in the provinces of Sé-tchuen and Yun-nan, near the frontiers of Thibet. No gold or silver money is coined. The tutenague is a white metallic substance, of which the Chinese make vessels and chandeliers. Its exact nature is still a problem. Some say that tutenague is the name given by the Chinese to zinc; others consider the tutenague of China as an artificial mixture of different metals, while the tutenague of India, according to them, is pure zinc, without any alloy of lead.[e] M. de Guignes affirms that it is a native mixture of lead and iron peculiar to China. The province of Hou-quang contains a mine which furnishes it in great abundance.[f]

[a] J. Klaproth has given the names of 39 distinct varieties of teas; and Remusat has added 17 others. The art of distinguishing these varieties by taste, colour, &c. is a very difficult one. The *tea-taster* of the English E. India Company has a salary of *L.*1000 *per annum*.—P.

[b] Trigault, Exped Sin. L. IV. cap. 2.

[c] Neuhoff, Ambassade, P. II. p. 96.

[d] M. Polo, de reb. orient. II. 17, 67, 68.

[e] Haüy, Minéralogie, t. IV. p. 158

[f] De Guignes, III. p. 262, &c.

The yellow copper of Yun-nan and other provinces is used for making the small coin which is current through the whole empire. But there is also a peculiar copper of a white colour, which the Chinese call *petung*, or according to some *pa-kfong*. The knowledge which we have of this metal does not enable us to decide on its precise nature. According to Kinumaun it is a composition of copper, nickel, and iron. To render it softer it is alloyed with tutenague, or what answers better, a fifth part of silver.[a]

Lead and tin are the two metals found in smallest quantity in China. That which is exported from Canton comes from Thibet and Japan. The mines of quicksilver must be abundant in Yun-nan, although we are not acquainted with their precise localities.[b] Realgar, or the native sulphuret of arsenic, known to us as a violent poison, is employed by the Chinese in blocks for making pagodas and vases. When they want to take a purge, they swallow vinegar and lemon juice which have been kept for some hours in vessels of realgar.[c]

Lazulite or lapis lazuli, jasper, rock crystal, nephritic jade, magnetic iron, granite, porphyry, and different kinds of marbles, are found in China. There is a kind of black marble possessed of a sonorous property, to which travellers have given the name of "the musical stone." Many images are made of pot-stone,[d] (the *talc graphique* of Haüy.) The interior of China undoubtedly contains a great number of useful or curious minerals; but the information respecting them furnished by missionaries and by the Chinese is extremely vague. Rubies, corundum, or adamantine spar, and some varieties of rock crystal, are found there. Nor must we omit to mention the three substances employed in the composition of Chinese porcelain: *petuntse*, a whitish laminated felspar; *kaolin*, a felspar in the state of earth or clay; and *che-kao*, or sulphate of barytes.

In several of the northern provinces mineral coal is found in great abundance. The Chinese pulverize it, and form it with water into balls, which are exposed to dry. There seems to be no fossile salt in the eastern parts of China; and kitchen salt is procured by crystallization from sea-water. The northern and western provinces contain abundance of saltpetre.

[a] Gillan, in Macartney, IV. 289.
[b] De Guignes, III. p. 255.
[c] Haüy, IV. p. 234.
[d] *Pierre de lard, smectite.*

BOOK XLIII.

CHINA.

PART II.

Topographical Details. Provinces and Towns.

The general view which we have taken of the physical state of China comprehends a selection of all that appears unambiguous in the different accounts given to the world. We proceed to the particular description of the provinces, beginning with that which contains the modern capital. It is not, however, to be expected that we shall describe the 1,572 towns, 2,796 temples, 3,158 bridges, 10,809 public buildings, or the 765 lakes, and the 14,607 mountains, enumerated by the Chinese authors. Though we shall avoid the unmeaning rapidity of the English geographers, we must not run into the opposite fault, but leave to such as Busching the unwieldy nomenclatures of the Chinese books.

The province of Petcheli, situated on the gulph of the same name, on the south side of the Great Wall, is productive in grain and cattle, but deficient in wood. The high mountains in the neighbourhood of Pekin furnish all the coal which is required for the consumption of the country; and though it is in general use, the mines have no appearance of being soon exhausted; these mountains also yield a little gold and iron; the soil is sandy and nitrous, the air cold and healthy.[a]

Pekin, the chief city of the province, is the capital of the whole Chinese empire, and the ordinary residence of its sovereigns. It is situated in a fertile plain, at a distance of twenty leagues[b] from the Great Wall. It is in the form of a long parallelogram, and is divided into two cities; the Tartar, or more properly the Mantchoorian city, contains the imperial palace, and forms, along with the other or Chinese city, an irregular whole, seventeen miles[c] in circumference. The walls of Pekin are fifty cubits in height, and conceal the buildings from the view; the gates are not embellished with statues or with sculpture, but their prodigious height gives them at a certain distance an air of grandeur. The arcades of the gates are of marble, and the remainder of broad bricks cemented with excellent mortar. The greater part of the streets are in straight lines; the largest are 120 feet wide, and nearly three miles in length, well-aired, light and cheerful. The whole street is generally occupied with shops, in which the silks and wares of China are sold. The fronts of the houses, which are very low, have a dull, gloomy appearance. The magnificence of the imperial palace does not consist so much in the imposing elegance of its architecture, as in the multitude of its buildings, its courts, and its gardens. The walls of the palace comprehend a little town, inhabited by the officers of the court, and a great quantity of mechanics, all in the emperor's service. Father Artier, a French Jesuit, who obtained permission to visit the palace, says that it is a league in circumference, that its front is embellished with paintings, gilding and varnished work, and that the furniture and ornaments of the interior comprise every thing that is most rare and valued in China, India, and Europe. The gardens of the palace form a vast park, in which, at proper distances, mountains rise twenty or sixty feet in height, separated from one another by little valleys, which are watered with canals; these waters unite to form lakes and broad ponds, which are navigated by magnificent pleasure boats, and their banks are adorned with a series of buildings, of which no two are alike. Each valley contains a summer house or villa, sufficiently spacious to accommodate one of the first noblemen of Europe, with all his attendants. The cedar of which these houses are built is not found within a less distance than 1400 miles[d] from Pekin. In the midst of a lake which is a mile and a half broad, there is a rocky island, crowned with a superb palace, containing more than a hundred apartments. The mountains and hills are covered with trees and beautiful aromatic flowers; the canals skirted with rocks so artfully arranged as to be a perfect imitation of nature in her wildest and most desolate forms. The whole has an air of enchantment. On the summits of the highest mountains tall trees encircle pavilions and kiosks consecrated to retirement and pleasure.

The temples of Pekin are not equal to the palaces. The religion of the Emperor is comparatively new in China, and its ceremonies are celebrated with less pomp in that country than in Tartary. The mandarins and literati, from whom the magistrates who rule the empire are selected, rather respect than worship Confucius, and assemble to honour his memory in simple, neat, and cleanly buildings.

The English make the number of inhabitants amount to three millions, an estimate ridiculously extravagant. The city of Pekin does not afford sufficient space for three millions of men to stand on. With these accounts we may contrast the testimony of the Russians who have visited Pekin,[e] who tell us that it scarcely doubles Moscow in extent; that a large portion of it is occupied by the palaces and their gardens, and that the houses are

[a] Dai-syn-y-tundschi, Chinese Geography, in Busching's Magaz. XIV. 411, &c. De Guignes, III. 298, 317.

[b] So in the original; the translation makes it 26 miles only.—P.

[c] "6 Fr. leagues."

[d] "500 Fr. leagues."

[e] Travels of Lange, with a geographical description of the city of Pekin, published in German, by M. Pallas, at Petersburgh, in 1780

not closer together than those of Moscow. Now we know that Moscow, though larger in extent than Paris, does not contain more than 300,000 inhabitants.[a] According to these data, Pekin will only contain 600,000, or, at most, 700,000 inhabitants.[b]

Pao-ting-fou is the residence of the viceroy of the province. On the south of that city we find a small lake celebrated for the quantity of *nenuphars*, or water lilies, found in it, and which the Chinese call Lien-Hoa. Their violet, white, or mixed red and white flowers, sometimes rise two or three cubits above the surface of the water which carries their floating leaves. Every part of this plant, even to its knotty root, is either adapted for food or some other purpose of utility.[c]

This city forms a stage on the road from Pekin to the province of Shan-Si, one of the handsomest and most agreeable roads that can be travelled. The whole country is level and cultivated: The road smooth, and in many places lined with rows of trees. It is constantly thronged with men, carriages, and beasts of burden.

To the south of the gulph of Petcheli is the peninsula which forms a part of the province of Shantong. The great Imperial Canal crosses it, and by this canal all the barks pass which are bound for Pekin from the south. An infinite number of lakes, rivulets, and rivers, enliven this province, in itself barren and exposed to great droughts by the extreme infrequency of rains. One part of the province is a vast plain on the two sides of the river. Wheat, millet, and tobacco, grow here, but herbaceous cotton is the chief produce of this as well as of the adjoining province of Kiang-Nan.

There are worms resembling caterpillars, which produce in the fields a white silk, which attaches itself in threads to the shrubs and bushes. Of this substance stuffs are manufactured, coarse in quality, but close and strong.

Tsi-nan-fou, the capital of this province, is famous for the lustre of its white silks. Yeu-tcheou-fou, a large and populous city, contains in its district the city of Kio-seou-hieu, celebrated as the birth-place of Confucius.

The mouths of the two great rivers, Hoang-ho, and Yangtse-Kiang, are in the province of Kiang-Nan, one of the most fertile, most trading, and consequently one of the richest in the empire. It is situated on the gulph of Nankin, in the Yellow Sea. Its inhabitants are regarded as the most civilized of the Chinese. Their silk and cotton cloths, their paper, and their varnished wares, are held in higher esteem than those of any other. Here the ancient emperors constantly held their court, till reasons of state obliged them to transfer it to the neighbourhood of Tartary, and fix on Pekin as their place of residence. Green tea is the chief production; the mountains, which are composed of sand-stone in well-marked strata,[d] furnish magnetic iron, copper, and a little silver.[e]

Nankin, formerly the capital of the whole empire, is situated on the Kiang, not far from the mouth of that river. Without reckoning its suburbs, it is said to be thirty-three miles[f] in circumference, but the missionaries most entitled to credit say that the ground now built upon does not exceed one-third of Paris.[g] Its ancient wall is at present in the midst of cultivated fields, and perhaps the vast extent of space which it included was formerly occupied in a great measure by gardens. The palace, a most beautiful building, was burned in 1645 by the Mantchoos. The only public buildings remaining at Nankin are its gates, which are extraordinary for beauty, and some temples, such as that to which the famous porcelain tower belongs, which has nine stories, is ascended by 884 steps, and, according to the Chinese, is adorned at the top with a pine apple of solid gold. All the outside is ornamented with different sorts of designs[h] in red, yellow, and green. The materials of this fine building are so well joined, that they have the appearance of being in one piece. At the corners of all the galleries are hung bells without number, which emit clear and delightful sounds by the impulse of the wind. Nankin passes for the seat of Chinese learning; its libraries are more numerous than those of any other place. Here the physicians have their principal school. The satins, plain and flowered, which are manufactured here, are the best in China.

To the south-east of Nankin we find Sou-tcheou-fou, a town intersected with canals. This place is a school for the ablest comedians, and the best rope dancers and cup-jugglers; it is the native place of the handsomest and smallest footed women; the dictatrix of Chinese taste, fashion, and language; and the resort of the most wealthy voluptuaries of China. "What paradise is in heaven," say the Chinese, "Sou-tcheou-fou is on earth." Long-kiang-fou is a town built in the water, so that vessels enter it and depart on all sides. It has a ready communication with the sea, which is at no great distance. It exports an extraordinary quantity of cotton. Tchin-kiang-fou is one of the maritime keys of the empire, and defended by a strong garrison. Its walls, in several places more than thirty feet high, are built of large bricks. Its streets are paved with marble.

At a distance of 600 paces from the shore of the Yangtse-kiang, is the wonderful island of Chin-schan, or the "Golden Mountain." This island, the shores of which are quite precipitous, is covered with gardens and pleasure houses. Art and nature have united their efforts to give it the most enchanting aspect. It is the property of the emperor. It is in the fields of this neighbourhood that the shrub grows which produces that variety of cotton of which the article known under the name of Nankeen is made. The fibre is not white like other cotton, but of a delicate pinkish orange,[i] which it preserves after it is spun and woven.

Yang-tcheo-fou is five miles and a half[k] in circumference; and the city and suburbs are said to contain in all 200,000 souls. This is probably only a temporary

[a] Before the fire of 1812.—P.

[b] The population of an Asiatic city is not to be estimated on European principles, according to the extent it covers. Much of the surface is occupied by palaces with their gardens, open spaces, and even cultivated fields. Moscow, at the period alluded to, was of Asiatic construction. Paris, with half the extent, had more than double the population; (in 1817, 715,000.)—P.

[c] Duhalde, t. I. p. 128.

[d] De Guignes, III. 317.

[e] Dai-syn-y-tundschi, in Busching, p. 433, 439, &c.

[f] "12 Fr. leagues."

[g] Journal des Savans, 1782, Juillet, p. 470. Duhalde, t. I. p. 128.

[h] "De differens vernis," with varnishes of different colours.

[i] "Jaune-rouge."

[k] "2 Fr. leagues."

population; the place being the emporium for the sale and distribution of salt. Ngan-king-fou has a separate viceroy. The inhabitants of Hoei-tcheou, the most southerly town of the province, are considered as the ablest merchants, overreaching the Chinese, who overreach all other nations. Here, also, is made the best China ink.

To the south-east of Kiang-nan lies the province of Tché-kiang, enriched by the cultivation of the silk-worm and the manufacture of silk stuffs. Nothing can be compared to the beauty of the country on the banks of the Tchiang; presenting a fresh variety of aspect at every step. In one place are steep rocks wholly destitute of verdure, on both sides of the river. In another, the river makes a turn, and suddenly displays to our view the richest and gayest rural scenery. The numerous sinuosities of the Tchiang keep the traveller's curiosity in constant exercise; and the scene is diversified and enlivened by the sight of farmers occupied in the culture of rice and the sugar-cane, and in carrying the produce to the different mills along the river sides.[a]

Han-tcheou-fou, the capital of the province of Tché-kiang, is one of the most important towns in China, situated almost in the middle point of its extensive range of sea-coast. It has the mouth of the Imperial Canal on one side, and the river Tchiang on the other. It is the emporium of the trade between the northern and southern provinces. Ning-po-fou, which the Europeans call Liam-po, is a town of the first order, and has an excellent harbour, to which the Chinese merchants of Siam and Batavia repair every year to buy silks. It also carries on a great trade with Japan, Nangasaki being at a distance of only two days' sail. The Chinese carry silks, stuffs, sugar, drugs, and wine, to that country; and bring home copper, gold, and silver. Chao-king-fou is a place penetrated in every direction with canals, supplied with the most limpid water. Its broad streets are paved with large blocks of hewn stone, and extremely clean. The triumphal arches and houses, contrary to the general custom, are partly built of that stone. The inhabitants are the most formidable of all the Chinese for chicanery. Every viceroy, and every great mandarin, prefers a native of this town for his siang-cong, or secretary.

From Tche-kiang we shall proceed southward to Fou-kien, one of the smallest, yet one of the richest provinces of the empire. Its situation is favourable for fishing, navigation, and trade. The air is very warm, but pure and healthy.

The fields are watered with an infinity of rivers and streams, which come from the mountains, and which the labourers manage with great dexterity for watering their rice grounds. Black tea is the principal produce. It also contains musk, precious stones, iron, tin, and quicksilver mines; silk, hemp, and cotton, are manufactured; steel is prepared, both in the form of bars and ready-made articles of hardware; and, among the delicious and abundant fruits which it produces, the oranges are remarkable for the flavour of muscat grapes which they possess.[b] Fou-tcheou-fou, the capital of the province, is above all celebrated for its situation, for the great trade which it possesses, for the multitude of its men of learning, for the beauty of its rivers, which bear the greatest barks of China to its very walls; and finally, for an admirable bridge thrown over the gulph, consisting of more than a hundred arches, and entirely built of beautiful white stone. Yen-ping-fou, situated on the declivity of a mountain, at the foot of which flows the river Min-ho, is not large, but it is considered as one of the handsomest towns in the empire. Tchang-tcheou-fou is near the port of Emouy, a great emporium of trade, frequented by the Spaniards from Manilla.[c]

Opposite to the coast of Fou-kien, is the large and fine island called by the Chinese Tai-ouan, and by the Portuguese Formosa. It forms part of the government or viceroyalty of Fou-kien.

It was in the reign of the Emperor Cang-hi that the Chinese first extended their knowledge and power to this island. It has remained in their possession ever since they drove out the Dutch in 1661. The latter had taken it from the Portuguese. It is divided into two parts by a chain of mountains. The western part has been inhabited by the Chinese ever since the Dutch were obliged to leave it; the remainder is possessed by the aboriginal inhabitants.

The coast of Formosa which is in the possession of the Chinese is certainly deserving of the name by which it is known; it is a truly delightful country. The air is pure and serene; the land is fertile in rice, in all sorts of grain, and in sugar canes; it is covered with magnificent forests, and watered by an infinite number of streams, which descend from steep and well-wooded mountains. Oxen are generally used for riding, for want of horses and asses. With the exception of stags and monkies, which make their appearance in flocks, the wild quadrupeds are not numerous. The fisheries of the coast present an abundant variety of food. Pheasants, heath-cocks, and pigeons, swarm in the woods. If the earthquakes were less frequent and less destructive, and if the water of the rivers were as well adapted for human use as it is for fertilizing the fields, there would be nothing to desire in this island, which in other respects produces all that is requisite to render life agreeable.[d]

Formosa has a Chinese government, with a garrison of 10,000 men, but its authority is limited to the west side. The city Tai-Ouan is populous and wealthy. The streets, in straight lines, and covered with awnings for seven or eight months in the year to protect them from the heat of the sun, lined with storehouses and elegant shops, where silks, porcelain, varnished and other wares, are arranged with admirable art, so as to give the appearance of so many charming galleries, would be delightful to walk in, if less crowded with passengers, and better paved. This city is defended by a good fortress, which was built by the Dutch, and called by them Fort de Zelandia. The harbour is spacious and deep, but the entrances to it are extremely narrow, and only from eight to twelve feet deep.[e] Between the port of Tai-Ouan

[a] Macartney, V. 183. De Guignes, Voyage à Pekin, III. 319.
[b] Duhalde, Martini, &c. *passim.*
[c] Renouard de Sainte-Croix, Voyage aux Indes-Orientales, III. 205, &c.
[d] Valentyn, Oud end nieuw Oostindien, t. VI. Description de Formose, p. 37, 40, &c. Rechteren, dans les Voyages de la Compagnie Hollandaise, V. 160, &c. Le P. Mailla, Lettres édifiantes, XIV. 28. 30.
[e] Pierre Nuyts, Mém. sur Formose, dans Valentyn, l. c. p. 63. Lettres édifiant, l. c.

and the coast of China, the little archipelago of the islands of Pongou, or Pescadores (*i. e.* fishermen's islands) affords good anchorage, and a station which, with a suitable navy, might command the channel of Formosa.

The savage people inhabiting the eastern and mountainous part of Formosa acknowledge no regular government. Resembling in complexion and features the Malays and other islanders of the South Sea, they speak a distinct language from all that we are acquainted with.[a] There seem, indeed, to be several indigenous tribes; and in particular, according to Valentyn's account, besides an olive-coloured, there is a negro race of gigantic size. The cottages of the Formosans are of bamboo; they have articles of furniture and utensils formed out of stag's leather. According to other travellers, they have in their huts no chairs, benches, tables, beds, or any sort of furniture. In the middle is placed a sort of furnace, about two feet high, which serves them for cooking. They feed on corn[b] and on game, which last they catch by hunting on foot, for they are possessed of surprising agility and swiftness. Their only bed consists of the fresh leaves of a particular tree common in the country. Their only clothing is a single piece of cloth, with which they cover their bodies from the middle down to the knees. Their skin is covered with indelible marks representing trees, animals, and flowers of grotesque forms; in the act of decking themselves with these barbarian marks of distinction, they inflict on themselves acute pain. The privilege of wearing them is allowed to none but those who, in the opinion of the chief persons of a district, have surpassed their fellows in running or in hunting. All, however, have the privilege of blackening their teeth, and of wearing bracelets, collars, and ear-rings. In the northern part of the island, where the climate is a little cooler, they dress themselves with the skins of stags killed in hunting, which they make up into a kind of dress without sleeves; and their cylindrical caps are made of banana leaves. They worship, though with little ceremony, a plurality of deities, whose priestesses are said to forbid the women from bearing children till they are thirty-six years of age, and take the most revolting means of prevention. Though we know few particulars of their superstitions, the bridge of souls, and the abyss of ordure into which they throw the manes of the wicked, indicate some connexion with central Asia.[c] A century ago, some of the Formosans preserved traces of the Christian religion and of the Dutch language, which they had learned together.[d] Their mode of burying the dead resembled that which is practised among the islanders of the Oceanica. The bodies were dried and remained a long time under sheds. —We now return to continental China.

The most considerable of the southern provinces is that of Quan-Ton, to the south-west of Fou-Kien, and bounded in its turn on the south-west by the kingdom of Tonquin. This province is fertile in grain and all kinds of fruits. It contains mines of gold, precious stones, and tin; also, pearls, ivory, and odoriferous woods, which are applied to all sorts of work. One rare production peculiar to this province is the tree called by the Portuguese "iron wood;" it resembles iron in colour, in hardness, and in weight; it sinks in water. Quan-tcheou-fou, which we call Canton, the capital of the province, is one of the most populous and wealthy cities of China. Its harbour is the only one in the whole empire frequented by Europeans. The wall by which it is inclosed is between four and five miles[e] in extent. The country, in the vicinity, is diversified with arid hills, verdant valleys, small towns, villages, high towers, temples, and houses of mandarins. It is delightfully watered by lakes, canals, and small branches of the river Ta. Covered with boats and junks. The city of Canton contains a great number of triumphal arches and temples richly ornamented with statues. The throng of passengers in the streets is so great that it is difficult to get along. There are few Chinese merchants in easy circumstances whose families live in the same place where their business is conducted; they are lodged either in the remote suburbs, or quite in the country.

The population of Canton is estimated by Father Lecomte at a million and a half; Duhalde reduces it to a million. M. Sonnerat accuses both authors of ridiculous exaggeration; he asserts that he has, with the assistance of several Chinese, ascertained the population of this city, and found it to be only 75,000; but he does not give the particulars of his calculation, and he every where betrays too strong prejudices against the Chinese to be credited on his bare assertion.[f] The companions of Captain Cook[g] learned from the British factors established at Canton a number of details, which seem to make the population of the city and suburbs 150,000. The inhabitants of the *sampans*, or boats, which are 40,000 in number, may be 100,000 at most, though the English have made them much more numerous. Thus Canton will contain in all 250,000 inhabitants.

We shall describe the trade of Canton in a more suitable place, and proceed in the mean time with our topographic survey. Macao, a Portuguese establishment on a little tongue of land belonging to an island, has nothing left of its ancient importance but the name. Three or four hundred negro soldiers formed its whole garrison at the time of Lord Macartney's visit. The number of its inhabitants amounts to 33,800 according to Renouard de Sainte Croix, and more than one half of them are Chinese. This little corner of land was allowed to the Portuguese in the days of their power and enterprise; and here, for a long time, they carried on a great trade, not only with China, which scarcely any other nation then visited, but with other countries of eastern Asia, and particularly with Japan and Tonquin. At present the English carry on the trade of Macao in the name of the Portuguese.

A group of rocks near one of the highest eminences of the city forms a cave called "the grotto of Camoëns;" as tradition says that the poet of that name composed in this place his celebrated Lusiad. An English inhabitant of Macao has contrived to include

[a] Mémoires sur Formose, dans les Annales des Voyages, VIII. p. 367.
[b] "De menus grains," rice. *Ed. Encyc.*—P.
[c] Candidius, Rélat. sur Formose, dans les Voyages de la Comp. V. 162.
[d] Lett. édifiant. XIV. 51, 52.
[e] "Nearly 2 Fr. leagues."
[f] Sonnerat, Voyage aux Indes, t. II. p. 24.
[g] Cook's Third Voyage, French translation, t. IV. p. 503.

within his garden wall this picturesque spot, the sacred retreat of misfortune and of genius.

The Larron Islands, near to Macao, are always filled with pirates, who frequently carry off the small Chinese craft employed in the coasting trade between Macao and Canton. A small European force could easily extirpate these pirates, but the efforts of the Chinese government to get rid of them are fruitless, in consequence of a connexion which they keep up with rebellious and discontented persons of the interior.

The southern point of the province of Quan-ton and of continental China projects in the form of a narrow peninsula towards the isle of Hainan, which belongs to this government, except when in a state of rebellion. This island has a superficial extent of 14,000 square miles.[a] The north part is a flat and level country; the south filled with high mountains. The air is unhealthy, and the water, unless previously boiled, cannot be used without injury. But numerous rivers, and frequent rains at certain seasons of the year, make the fields fertile in sugar, indigo, cotton, and, above all, in rice, of which the inhabitants often raise two crops in a year. The capital Kioun-tcheou-fou is situated on a promontory, and the vessels anchor close under the walls.

The natives are generally ugly, of low stature and copper complexion; their hair is passed through a ring on the forehead. They go almost naked. The women, by way of heightening their attractions, draw a number of blue lines with indigo from the eyes to the lower part of the face. Both sexes wear gold and silver ear-rings. They are armed with bows and arrows, but they are more dexterous in the use of a kind of cutlass. This is the only tool which they employ in carpentry, and for clearing away the trees and bushes which obstruct their way in traversing the forests.

Besides the gold mines in the centre of the island, there are several coloured boles in the north which are carried to Canton for colouring the porcelain. The best wood, both for perfume and for carving, comes from the mountains of Hainan. The most valuable of these woods, next to the eagle-wood, is that which the Europeans call rose-wood, or violet-wood. There is also a yellow wood of remarkable beauty, and which has the character of being incorruptible. This is formed into small columnar pieces, which are sold at a very high price. There is a pearl fishery on the shores. It is said that the Chinese have the art of making the muscle secrete the juice which hardens into that precious substance. When the muscle, coming up to the surface, opens its shell, a piece of packthread is introduced, to which balls of mother of pearl are attached;[b] according to others, they introduce a piece of brass wire, and the wounded animal covers these foreign substances with a juice which hardens into mother-of-pearl, or even true pearls.[c] Similar practices were not unknown to the ancients;[d] and Linnæus announced, half a century ago, that he had found out the secret of making muscles produce pearls.[e f]

The province of Canton is separated from that of Kiang-si by the great mountain called Mi-lin, over which a road is formed, for about a league, bordered by frightful precipices. There is a temple in the place consecrated to the memory of the mandarin under whose orders this work was executed The passage is thronged like the streets of a large city.

Passing the mountains, we discover beautiful valleys and well cultivated fields. But this fertile province produces scarcely any overplus of rice above what is required for the support of its numerous inhabitants. The latter have the character of being rigid economists, and their mean avarice subjects them to the raillery of the Chinese of the other provinces. The lakes and rivers are full of salmon, trout, and sturgeon. The mountains are either clothed with wood, or celebrated for their medicinal plants, and their mines of gold, silver, lead, iron, and tin. Very fine stuffs are manufactured here, and the rice wine of this country is highly delicate in the estimation of the Chinese. The province is principally celebrated for the fine porcelain made at King-té-tching. This place is considered as a subordinate town;[g] yet the missionaries give it a million of inhabitants. They reckon not quite so many in Nan-tchang-fou, the capital of the province.

Porcelain is the leading article of commerce in this quarter. Indeed, the true porcelain is made nowhere else. That which is made at Canton, in the province of Fou-kien, and some other places, is not so much valued in China as common crockery is in Europe.

The vast province of Hou-quang is in the centre of the kingdom: the river Yang-tse-kiang passes through it. The greater part of the province is a flat country, divided by lakes, and watered with rivers, which are stocked with immense quantities of excellent fish, and frequented by numberless flocks of aquatic birds. The cattle which are fed on the produce of the fields are in great number. Every sort of grain and of fruit grows here, particularly oranges and citrons in all their varieties. This province is considered as the granary of the empire. It has its mines of iron, tin, and other metals, and gold is obtained from the sand of its mountain torrents.

Vou-tchang-fou, the capital of this province, is almost the central point of China. In extent it comes near to Paris. It derives an immense profit from its manufacture of bamboo paper. Hang-yang-fou is separated from Vou-tchang-fou only by the Kiang. It also is a large and very commercial town.

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[a] "More than 1800 square French leagues."

[b] Mem. of the Acad. of Sciences at Stockholm, XXXIV. p. 89, (German translation.)

[c] Fabricius, Lettres écrites de Londres, p. 104.

[d] Philostrat. Vit. Apollon. III. 57. edit. Olear. p. 139. Tzetzes, varior. II. segm. 375. Gesner, Hist. Natur. IV. 634.

[e] Schlœtzer, Correspondence, cah. XL. p. 251.

[f] Hainan, properly signifies South Sea. It has been considered a corruption of Hai-lam, west country, but erroneously. It lies between 18° and 20° N. It is 165 miles long by 75 broad. It is principally occupied by high primitive mountains, low sandy plains, and rocky ridges, with a few fertile valleys. The eastern coast is rocky and steep, with fine harbours; the N. W. low and shoaly. The soil is barren. The valleys are cultivated with rice, but the general crop is the sweet potatoe. The island is populous. It contains 14 walled towns, but ruinous It is part of the province of Quantong, with a deputy governor. The language is distinct from that of Canton. They are a distinct race Many of the primitive unmixed natives are found in the mountains of the interior. They are timid and inoffensive. The capital is Kiuntcheou, in the N. W., on the gulph separating it from Quantong. Its trade is considerable; its junks small, but numerous.—*Asiatic Journal.*—P.

[g] "*Bourg.*"

The strong city of Kin-tcheou-fou is considered as one of the keys of the empire. It is situated in the north-west, at the bottom of the mountains.

From this fortress we may take an excursion northward into the province of Honan. The mildness of the climate and the fertility of the soil render this province a delightful country, and the Chinese call it the garden of their empire. They believe that this was the province in which Fo-Hi, the founder of their monarchy, established his court. The air is certainly both temperate and salubrious. Productions of all kinds are in the greatest abundance. Fields of wheat and rice, pastures, delicious fruit trees of every sort, and numbers of cattle, form almost the whole scenery of this rich country, which is almost all level, except in the west, where we find mountains that are covered with forests.

Cai-song-fou is a large, wealthy, and populous city on the river Honan, in a low situation, inferior to the level of the river. Hence, though dykes are built to protect it from inundations, it is very much exposed to danger. In 1642 the emperor ordered one of the dykes to be cut, in order to destroy a rebel prince who had fortified himself in this place, in consequence of which 300,000 persons were drowned. In former times the Chinese were simple enough to consider the city of Honan-fou as the centre of the world, because at that time it was in the heart of their empire.

The city of Ting-fou-hien is famous for the tower erected by the celebrated Tchou-kong, where he was in the practice of observing the phenomena of the heavens. There is still an instrument in this place which is said to have been used by him for taking the shadow of the sun at mid-day, in order to find out the elevation of the pole.[a] He lived nearly a thousand years before the Christian era, and the Chinese ascribe to him the invention of the mariner's compass.

Let us now examine the north-west portion of China. The province of Shansi is one of the smallest; it is bounded on the east by that of Pe-tche-li. The great wall is its boundary on the side of Mongolia on the north. The Chinese history bears that this was the province in which the first inhabitants of China fixed their abode. The climate is pleasant and healthy. The country, though mountainous, is fertile in millet, in corn, and above all in grapes, of which the Chinese might no doubt make excellent wine if they chose, but they prefer drying them as raisins.

This province contains porphyry, marble, jasper of various colours, and a blue mineral with which they colour their porcelain. In every quarter are very abundant iron mines; also, saline lakes from which salt is obtained, and mineral waters.

The capital, Tai-yuen-fou, was once a beautiful city, full of palaces inhabited by princes of the imperial blood of Tai-ming-tchao; but these fine buildings have gone to ruin. Carpets similar to those of Persia and Turkey are wrought here. Iron wares are also made, and form a prominent article of commerce. This ancient and populous city is about eight miles[b] in circumference. On the neighbouring mountains there are beautiful sepulchres of marble and hewn stone, triumphal arches, statues of heroes, and of lions, horses, and other animals; and the whole is encircled with a forest of old cypresses planted in mutually intersecting rows.[c]

Shen-si is the largest province of China. It is con terminous with Mongolia, the Kalmuks of Hoho-nor, and the Sifans. The temperature is mild. Here for many ages the emperors resided. The inhabitants of this province are stronger, braver, and more handsomely formed than the other Chinese: its soldiery has always been comparatively formidable. It produces many medicinal plants. Great numbers of cattle, and particularly of mules, feed on its mountains. Wheat and millet grow with such promptitude, that in winter the farmers turn in the sheep upon the corn fields to keep down their luxuriance, and their growth is renewed with fresh vigour in the spring. In the neighbourhood of Lin-tao-fou, and about the fountain of the Sifans, are found wild oxen, and, according to report, a species of the tiger.[d]

Singan-fou, the capital of this province, is, next to Pekin, one of the finest and largest cities of China. Its walls are eleven miles[e] in extent. Some of the gates are magnificent and uncommonly lofty. An old palace is still to be seen, which was the residence of its ancient kings. In this city the principal Mantchoo troops destined to the defence of the north of China are stationed. In 1685 there was found in the neighbourhood, in digging the foundations of a house, a marble slab containing an inscription in Chinese characters, together with words in the Syriac language, and a cross carved on the top. Many of the learned have laboured to discover the meaning of the words and figures. There are sixty-two marks in Chinese characters, divided into twenty-nine columns; they consist of a treatise on the principal articles of faith, together with several points of church discipline. It contains at the same time the names of the emperors or kings who favoured the preaching of Christianity when introduced in the year of Christ 635 by Nestorian missionaries from Persia and Syria.[f] These Nestorians had still many churches in China in the time of Marco Polo, about the year 1300.[g h]

The extremity of the province of Shen-si, which advances to the north-west in a peninsular form between the country of the Mongols and that of the Kalmuks of Hoho-nor, is called the district (in Chinese *fou*) of Kantcheou or Kansou. The missionaries scarcely mention it, but Sir George Staunton makes it a province.

Directing our course to the south-west we enter Sétchuen. This province yields to few others in the empire either in size or rich productions; it was at one time desolated by the wars of the Tartars, but it has been subsequently re-improved. The great river Yang-

[a] Mailla, Hist. de la Chine, I. 319. Comp. De Guignes, fils, dans les Annales des Voyages, &c. VIII. 165.
[b] "3 Fr. leagues."
[c] "En echiquier," in checker-work.
[d] Duhalde, I. p. 212.
[e] "4 Fr. leagues."
[f] Alvarez de Semedo, Historia de la China. Lecomte, Mémoir, I. 143. Duhalde, &c.
[g] Marco Polo, de Reb. Orient. II. 61, 64, I. 62.
[h] There are many Mahometans in Sin-gan-fou, who are called *Tungani*.—P.

tse-kiang passes through it, and diffuses fertility on every hand. The inhabitants cultivate silk, wine, wheat, and fruit in abundance. It contains iron, tin, lead, and quicksilver. It is famous for its amber, its sugar canes, its excellent magnets, and lazulites of the finest blue. Its horses are in request, being very handsome and spirited, though small.

Tching-tou-fou, the capital of the province, was formerly one of the finest cities of the empire, but having been devastated in the civil wars of 1646, along with the whole province, it has lost much of its ancient splendour; yet it is a very populous and thriving place of trade. It is delightfully situated on an island formed by several rivers.

Long-ngan-fou has, in consequence of its situation on the frontier of Tartary, always been considered as one of the most important places in the province. It is defended by several fortresses, more necessary in former times than now.

On the south-east we come to the province of Koeitcheou, which is acknowledged to be ill-peopled and ill-cultivated. It is filled with inaccessible mountains, which have long served as a retreat to independent hordes called Seng-miaosse. The emperors have at different times attempted to people this province, by sending to it whole colonies; but these efforts seem to have been hitherto unavailing: the tribes belonging to it are unable to supply the necessities of the numerous garrisons established in the country; and the court is obliged to supply them from the imperial treasury. The mountains contain mines of gold, silver, copper, tin, and mercury. The copper of which the small current coin of the empire is made, is partly obtained from this quarter. It produces the best horses in China. It has no silk, but that defect is supplied by stuffs made from a plant resembling hemp, which are well adapted for summer wear.

Koeï-yang-fou, the capital of this province, is one of the smallest cities in China, being only about two miles[a] in circumference. The houses are partly of earth and partly of brick. Se-tchou-fou is a town, the inhabitants of which, though the least rude of any in the province, live in profound ignorance of the Chinese branches of knowledge. They go barefooted, and walk over the rocks with surprising celerity.

To the south of this wild province, we find that of Quang-si, which is not one of the best peopled in China. It produces rice in such abundance that the province of Canton is supplied from it for six months in the year. Yet it is only raised advantageously in the plains of the south, where the air is mildest. The north presents nothing to the view but an uncultivated soil, and mountains covered with thick forests.

In this province there are mines of all sorts of metals, particularly of gold and silver, but the policy of the government prohibits individuals from opening them. It produces cinnamon of stronger and sweeter flavour than that of Ceylon.

Quei-ling-fou, the capital, is situated on the Eta. In this country are found the best stones employed by the men of letters in making their ink. Marco Polo says that he saw in that country fowls which, instead of feathers, had hair like that of the cat.[b] These are what are called silk-hens.[c]

The people of Quang-si are reckoned barbarians by the Chinese, because their manners have a certain rudeness very different from the mild and ceremonious deportment of the rest of the nation.

In the south-west corner we find the province of Yunnan, one of the richest in the empire, adjoining the kingdoms of Ava, Pegu, Laos, and Tonquin. It is all intersected by rivers, and the air is extremely temperate. The mountains contain mines of gold, silver, copper, tin, and precious stones, especially rubies, and that variety of marble, which when polished represents in varied colours scenery of mountains, flowers, trees, and ruins.[d] It produces small but vigorous horses, and deer no larger than our common dogs. Perhaps these are the *Cervus axis*. The inhabitants, though hardy and stout, are mild and affable, and have a remarkable aptness in learning the sciences. The nation which formerly took the lead in this province was called the Lolos, and was governed by various sovereigns. After long wars undertaken for the purpose of subduing it, the Chinese adopted the plan of conferring on the Lo-los nobility all the honours of Chinese mandarins, with the right of hereditary succession, on condition of their acknowledging the authority of the Chinese governor of the province, receiving from the emperor title-deeds to their estates, and doing no public act without his consent. The Lo-los are not inferior in stature to the Chinese, and are more inured to fatigue; they speak a different language; and their writing, as well as their religion, resembles that of the bonzes of Pegu and Ava. These bonzes have built in the north of Yunnan large temples, different from those of the Chinese. The nobility of the Lo-los claim absolute authority over the people, who behave towards them with the most profound submission.

We have little knowledge of the towns of Yunnan. It is asserted that the capital, Yunnan-fou, built on the banks of a broad and deep lake, has long been the residence of a prince subject to the Chinese. It contains manufactures of satin and of carpets. Its trade in metals is necessarily great. Tchin-kiang-fou is another place on the side of a lake, in a picturesque situation. Vouting-fou is one of the frontier bulwarks of the empire.

[a] "Scarcely a Fr. league."
[b] Marco Polo, de Reb. Orient. II. 68.
[c] "*Poules de soie.*"
[d] Ruiniform marble. Haüy.—P

BOOK XLIV.

CHINA.

PART III.

Political and General View of the Nation.

A most extensive field would still remain, if we wished to enter into all the researches which are requisite for a complete description of the political state of China. But these details, however well adapted for a monographic or statistical work, are not suited to the narrow compass of a compendious universal system of geography. This is, besides, a subject which has too often exercised the sagacity of Europeans without ultimate satisfaction. We do not flatter ourselves with the hope of being able to solve questions by which even those who have visited this singular country find themselves embarrassed. For this double reason we shall confine ourselves to a very summary view.

In features, and the shape of the bones of the head, the Chinese approach to the great race of the Mongols. The head is almost quadrangular, the nose short without being flattened, the complexion yellow, the beard thin; the oblique direction of the eyes is more particularly characteristic of the Chinese and their colonies, such as the Japanese and Coreans. A residence for many ages under a milder climate has conferred on this race, since their arrival from central Asia, a particular character, and rendered their countenances handsomer, though it has weakened their expression. There is, undoubtedly, a great difference between the southern and the northern Chinese, between the inhabitants of the mountains, those of the plains, and those of the maritime districts. In colour we know there are great varieties; but we have not sufficient information to enable us to trace the successive shades by which the rough Kalmuk is separated from the polished inhabitant of Canton.

A Chinese female becomes vain of her beauty in proportion to the smallness of her eyes, her pouting lips, the lankness and blackness of her hair, and the extreme smallness of her feet. This last qualification completes the idea of beauty. In order to confer on them this nigh perfection, their feet are carefully swathed as tight as possible in their youth, so that when grown up they seem to totter rather than to walk.[a] Among the men, corpulence, as a symptom of an easy life, commands a certain degree of respect, and men of thin forms pass for persons void of talent.[b] People of quality allow the nails of their fingers to grow. The hair of the head and of the beard is stained black.

Considered in a moral point of view, we soon perceive that the Chinese possess the usual virtues and vices of the slave, the manufacturer, and the merchant. A despotism of the most absolute kind has either acquired or preserved for China the external forms of patriarchal government. But, the sovereigns having neglected military discipline, frequent revolutions occurred in former times, till at last the country fell under the power of foreign conquerors, the Mantchoos. From that period the whip of the Tartar has been conjoined with the paternal rod by which China was previously governed. The only institution tending to limit the royal power, is one by which the mandarins and the tribunals are allowed sometimes to make very humble remonstrances to the emperor on the errors of his government. Under a virtuous prince, this liberty has often been followed by the most salutary consequences.—The emperor is styled the sacred son of heaven, sole ruler of the earth, the great father of his people. Offerings are made to his image and to his throne; his person is adored; his people prostrate themselves in his presence; the noblemen of his court, when addressed by him and receiving his orders, must bend the knee; every thing around him participates in the idolatry which is lavished on his person. His numerous concubines, and the eunuchs to whose charge they are committed, not unfrequently reign in his name. When this demi-god goes abroad, all the Chinese take care to shut themselves up in their houses. Whoever is found in his way is exposed to instant death, unless he turns his back, or lies flat with his face on the ground. All the shops by which the emperor is to pass must be shut, and this prince never goes out without being preceded by two thousand lictors carrying chains, axes, and various other instruments characteristic of eastern despotism.

The different civil and military appointments are filled by nine classes of officers which the Europeans call mandarins. The power of the mandarin is fully as absolute as that of the sovereign from whom he derives his authority. An officer of this description entering a city, can order any person whom he chooses to be arrested, and to die under his hand, and no one can venture to undertake his defence. He is preceded by a hundred executioners, who, with a sort of yell, announce his approach. Should any one forget to retire to the

[a] Macartney, II. 239, Atlas, pl. 11.

[b] De Guignes, I. 397. II. 157—159.

side of the wall, he is mauled with whips of chains or rods of bamboo. The mandarin himself, however, in his turn, is not secured against the punishment of flogging. For the slightest prevarication the emperor will order the bastinado.[a]

These mandarins are far from being what Voltaire represents them, philosophers occupied with contemplations on the beauties of natural religion, who, raised above human passions, watch with fatherly care over the frailer virtue of their brethren. They are not a set of patriots who guard with integrity, and defend with energy, the sacred trust of liberty and public justice. They are nothing else than the satellites of an absolute despot. Badly paid, they support themselves by the produce of their vexatious exactions.

The pretended wisdom of the Chinese laws may be characterized in few words. It consists in good regulations of police, and fine discourses on morality. The emperor never alters the laws, because they leave the absolute power in his hands. The mandarins have equally little inclination to alter them, because they invest them with absolute authority over the people. There are courts where, in point of form, complaints may be brought against superiors, but under the full certainty of the complainer being punished for his audacity. There is no disunion among the aristocracy, because, while they hold the rod over the heads of the multitude, they see the imperial lash waving over their own. The despotism of the Mantchoo sovereign represses that of the grandees, and obliges them to remain united. There is no resistance on the part of the people; they have no courage, though much cunning; they find it safer to preserve a part of their precious property by grovelling at the feet of their masters, than to risk the loss of the whole in order to obtain their liberty. Besides, they have scarcely a motive to rebel; though robbed by their superiors, they are suffered to rob in their turn, by using false weights, and disguising their goods. Justice is ill administered, but that is only to those who are foolish enough to neglect paying the expected price. Thus the rich man is content, and the poor is kept down. It often happens that the peasantry, on the point of starving, betake themselves to highway robbery. These, unless too strong to be overpowered, are hung. When they beat the armies sent against them, negociations and stipulations follow, or they are left independent in their haunts.[b] From this source the governors sometimes derive a little revenue. In short, all the notions of a Chinese from his infancy are directed to a single point, obedience. The sacred nature of social rank is perpetually impressed on his mind by innumerable ceremonies; at every step he makes a bow; every phrase that he utters must be a compliment. Not a word can he address to a superior without calling to mind his own utter insignificance.

But the great secret of Chinese policy, and the very basis of the empire, is to be found in an institution which in some measure deprives the inhabitants of the power of forming new thoughts, by depriving them of the liberty of expressing them by means of external characters corresponding to the words of their language. Such is the effect of the Chinese mode of writing. It has been compared, though not with much propriety, to the hieroglyphical or figured language of the Egyptians.[c] It can only be compared to those systems of pasigraphy, or universal character, by which some wrong-headed persons in Europe have brought on themselves universal ridicule. If all the fundamental or generally necessary ideas are arranged in a certain order; if under these generating ideas all those others are classed which are furnished by common language, or which occur to the judgment of the contriver; if each of the leading ideas has a representative sign; if this sign is arbitrary, or shapeless, rude, and whimsical; if these signs, elevated to the rank of the true keys of the language, are made the constant basis of signs equally abstract and arbitrary to denote the subordinate idea; this system will give us a perfect picture of the learned language of China. Its keys,[d] 214 in number, and its derivative signs, amounting to more than 80,000, do not express words but ideas.[e] They are addressed solely to the eye and the memory. They never excite the imagination; and not a hundredth part of them have any corresponding vocal expression. The beauty of a Chinese poem consists in not admitting of being read aloud;[f] and the eminent literati of that country conduct their disputes by describing in the air, with their fans, characters which do not correspond to any word in the language which they speak.[g]

The spoken language of the Chinese is composed of monosyllables, and scarcely contains 350 terms which a European can distinguish from one another; but the Chinese can, by various inflections of the voice, distinguish a much greater number. Thus the word *tchoun*, varied by intonation, signifies "a master," "a pig," "a kitchen," "a pillar," "an old woman," "a slave," "a prisoner," "liberal," or, "to prepare." Notwithstanding this contrivance, the very same sound often answers to several characters and several ideas; *pe* short, for example, signifies "north," "white," "cypress," "a hundred," and many things besides. The syntax also is barbarously meagre; declensions and conjugations are wanting, and their place is supplied by puerile circumlocutions. The written or learned language rejects

[a] De Guignes, II. 445. Mém. des Mission. VIII. 41—348.

[b] There is a secret society in China, in many particulars resembling the freemasons. It is called the Triad Society, (*San-ho-hiong, society of three united.*) Its first object was mutual benevolence, but it has degenerated into an association of plunderers and disorganizers. It is administered by a council of three, called *ancients*, who have a greater share of plunder than the others. Their ceremonies of initiation consist in solemn oaths, taken under a line of naked swords suspended above the admitted member; in prayers, invocations, &c. Their signs of recognition are certain mystic numbers, particularly 3, and its multiples; motions of the fingers, odes, &c. Their seal is a pentagon with certain significant words and characters. They pretend to a remote antiquity, make a vow of mutual beneficence, and profess liberty and equality, under the name of *brothers*, (Heung-te.) *Milne.* Two other associations of a similar kind, if not the same, are mentioned in the *Edinburgh* Encyclopedia; viz. Thian-thee-ohe, and Pe-lin-kias. They had become so disorderly and dangerous, that in 1798 the government proscribed them, and subjected them to the severest penalties.—P.

[c] Fourmont, Meditat. Sinicæ, p. 73.

[d] Bayer, Museum Sinicum. Petersb. 1730. Fourmont, Gramm. Paris, 1742. Tracts by Deshautesraies, Hager, Montucci, de Guignes father and son; but in preference to these, by Messrs. Jules Klaproth and Abel-Remusat.

[e] The number of characters in general use, according to Dr. Morrison, is only about 2000.—P.

[f] Barrow, II. 13.

[g] Remusat, Essai sur la Langue Chinoise, p. 33.

these aids entirely; it places a number of characters together, and leaves the reader to judge of their mutual relations.[a] This obscure brevity, dryness, monotony, and poverty, which render the language in a literary point of view so contemptible, prove at the same time its antiquity and its purity. It might, without much improbability, be regarded as the primitive origin of the Thibetan and Annamitic languages.

This institution, not singular in the end at which it aims, but altogether unique in its method of proceeding, perpetuates that infantine imbecility of intellect by which the Chinese are degraded, and almost rendered inferior to nations immersed in the savage state. The spoken language, in the first place, is left in a deficient state. The ideas of the people receive no enlargement, because the higher classes cannot express their thoughts except in a language totally distinct, and only understood by the select few. The information of the privileged class has no means of becoming disseminated by speech, where the signs for representing ideas have no corresponding words. This information must become obscure or utterly extinct even among those to whose care it is confided; for a dumb language of this sort, which excites no feeling of the heart, and gives no picture to the imagination, is a mere barren repository, in which reflection and memory alone are concerned. The human mind has many faculties, all of which require to be developed; and the thinking being is formed and rendered fit for his office only by the joint harmonious operation of his different powers. If every thing is sacrificed to a single faculty, the sublime machine of thought will have its equilibrium deranged, and its activity relaxed and weakened. This stupid fixedness of mind, which holds the Chinese in a state of eternal childhood, bears an exact resemblance to that nullity of sentiment and of judgment which the exclusive study of a single science is sometimes observed to produce on geometricians, on grammarians, and on naturalists of classification and nomenclature.[b]

It is almost a profanation of the name of science to apply it to the childish notions which the Chinese preserve as a precious inheritance from their ancient sages and legislators. The interests of mankind are foreign to this people. The great theatre of nature does not rouse them to those bold researches in which the science of Europe engages with such keen delight, though sometimes involving itself in error. Their vaunted moral philosophy is almost confined to the doctrine of obedience to the laws, and the minute code of humble compliments and ridiculous civilities which constitutes their notion of politeness. They have no conception of the principles which constitute the beautiful in literature, the regular in architecture, or the natural in painting. If they have discovered a sort of beauty in the arrangement of their gardens and the distribution of their grounds, it is because they have copied with exactness nature in a strange though picturesque form. Projecting rocks, as if threatening every moment to fall, bridges hung over abysses, stunted firs scattered on the sides of steep mountains, extensive lakes, rapid torrents, foaming cascades, and pagodas raising their pyramidal forms in the midst of this confusion; such are the Chinese landscapes on a large, and their gardens on a small scale.[c] The Chinese perform arithmetical operations with incredible celerity, though in a different manner from the Europeans. Before the latter landed in their country, they were ignorant of mathematics, and all the arts which depend on them. They had no convenient method of making astronomical observations. The metaphysical knowledge which existed among them was confined to the philosophers. The arts introduced by the Jesuits flourished among them only for a short time, and disappeared under Canghi, the cotemporary of Charles II. and Louis XIV., nor is there any likelihood of their reviving. It is generally believed that they knew the art of printing before the Europeans, but that applies only to engraved plates; they never knew any thing of cast and moveable types, the invention of which belongs to the Dutch or to the Germans. The Chinese, however, had almanacks printed in the block way many centuries before printing was known in Europe.

Mechanical talent alone has met with encouragement among the Chinese; their industry in the manufacture of stuffs, of porcelain, of lacquered work, and other sedentary productions, is astonishing, and can be compared to nothing in the world but their own labours in the fields, such as the construction of canals, the levelling of mountains, and the formation of gardens. Yet in many of these same operations we find sufficient proofs of the impossibility of a nation of slaves carrying even the mechanical arts to perfection.

We have mentioned the great inferiority of the locks on their canals. Their navigation is equally little entitled to our praise, although, previously to ourselves, they had remarked the polarity of the magnet. The compass is in general use among the Chinese. The needle which they employ is hung with extreme delicacy, and is singularly sensible, changing its position with the least change of the direction of the box. The name which the Chinese give to their compass is *tingnan-ching*, or "the needle which shows the south;" and they have a distinguishing mark for its south pole as we have for the north.[d]

Their ships are enormous machines, some of them a thousand tons burden. The two ends are prodigiously raised, presenting an extensive surface to the wind. More than one half of them are wrecked; for when once heeled over they cannot be righted. Their anchors are made of wood. Their pilots are not better instructed than the meanest cabin boy. On their voyage to Japan or the Philippines they are regulated by the stars like the rudest savage, and those who sail to Batavia, Malacca, or Queda, never go out of sight of land.

But the elegance of their sampans is deserving of

[a] As for example, "sea no limit," for "the sea is illimitable."

[b] The number of Chinese characters, in the penal code of the empire, is only about 2000. The ancient symbols, from which the alphabet is supposed to have been formed, are about 400. The modern roots are 214. There are 411 syllables in the oral Mandarin dialect, by the various inflections of which the whole spoken language is constituted. *Morrison.*—P.

[c] Chambers, Dissertation on Oriental Gardening. London, 1772. De Guignes, I. 377, II. 406, 409. Renouard de Sainte-Croix, III. 156.

[d] De Guignes, II. 202, 207. Barrow, I 64, 101.

commendation. That species of gondola is employed on the rivers. They are painted with a beautiful yellow varnish. The sails are made of very handsome mats, but stiff and heavy. The cordage by which the yachts are towed is of bamboo bark, and appears very good for hauling, though for any other purpose they could not be substituted for hemp and flax ropes, which are also made of excellent quality in China.

The monuments of the Chinese have been too much extolled. But we cannot help admiring some of their great roads, their one-arched bridges, their pyramidal towers, and their strange but sumptuous triumphal arches. THE GREAT WALL, in a most particular manner, cannot be beheld without astonishment. This celebrated rampart of China passes over high mountains, crosses deep vallies, and extends from the province of Shen-si to the Wang-hay, or Yellow Sea, in a line of 1240 miles.[a] In many places it is only a simple rampart; in others it has foundations of granite, and is built of brick and mortar.

Sir George Staunton, with Duhalde, considers the antiquity of this great wall as undoubted.[b] Duhalde informs us that it was built 215 years before the Christian era, by the orders of the first emperor of the dynasty of Tsin. In another part of his work he refers the founding of it to the second emperor of the same dynasty, which makes its epoch 137 before Christ. Mr. Bell, a well informed traveller, says that it was not built till the year 1160. Among the eastern geographers, those who are more than 300 years old make no mention of the wall.[c] Marco Polo in the thirteenth century knew nothing of it, though he resided long in Cathay, or the north of China and Mongolia. It is probable that this wall has been rebuilt, neglected, and allowed to go to ruin more than once, according to the state of political necessities; so that the present wall is not of very high antiquity, and its preservation presents no subject of surprise.

We shall not tire our readers with a minute examination of the domestic manners of the Chinese. The houses are of brick and hardened clay, and very often of wood. In general they have only one story. Those of the merchants have an upper story, which is used as a storehouse. The exteriors of the buildings are adorned with columns and galleries; their appearance is improved by small flower-pots, in which the Chinese take great delight, presenting an agreeable mixture of verdure with the varied colours of their numerous blossoms. Each house stands by itself, surrounded with gardens and spacious court-yards. The rooms are kept clean, with very little decoration. Even glass is not very liberally used, though that species of ornament might seem likely to please the taste of a vain and childish people. The Chinese dress themselves in long robes, with wide sleeves, and flowing silk girdles. The shirt and drawers are different at different seasons. Furs are every where seen in winter, varying in quality from sheepskin to ermine. The Chinese wear a small funnel-shaped hat, which varies with the dignity of the individual, and is mounted with a large button of coral, crystal, or gold. The materials of which this button is made, and its colour, mark the difference of rank in the wearer. The general dress is simple and uniform. Usually the only article which distinguishes the emperor himself from his courtiers is a large pearl with which his bonnet is adorned.

In the public festivals of the Chinese, displays of fireworks make the most conspicuous figure. In these the Chinese are said to excel; but it is in broad day that they exhibit them, as if afraid that they could not otherwise be seen. Their theatre, so much praised by Lord Macartney, seems not to have given equal pleasure to M. Guignes.[d] The Shakspeares of Pekin never observe unity of time or place; rules which are not quite essential in themselves, but which arise out of another rule, important in the eyes of all nations, that which prescribes for every production of human genius a unity of interest and of thought as an indispensable condition, founded in the moral and intellectual nature of man. In a Chinese tragedy the actor is often supposed to traverse immense local distances in the twinkling of an eye; and it often happens that the same who in the first act is an infant, becomes an old man before the piece is concluded.[e]

In the Chinese operas spirits make their appearance on the stage; birds and other animals speak as well as walk. "On our return from Pekin," says M. Guignes,[f] "the mandarins had the politeness to cause the piece called the 'Tower of Sy-hou'[g] to be acted before us. The scene was opened by genii mounted on serpents, and taking an airing by the side of the lake. A bonze of the neighbourhood fell in love with one of the goddesses, and paid his addresses to her. The latter, unmoved by her sister's remonstrances, listened to the proposals of the young man, married him, became pregnant, and was delivered on the stage of a child, who in a few minutes was able to walk. Enraged at this scandalous conduct, the genii dismissed the bonze from his priestly functions, and, in the end, struck the tower with lightning, by which it was reduced to that dismantled state in which the tower of that name actually is."

If to these incongruities we add, that an actor is often in the presence of another actor without being supposed to see him: that, in order to intimate that one enters a room, it is enough to pretend to open a door, and to raise the foot in order to step over the threshold, though no trace of door or threshold is exhibited, and that a man who holds a whip in his hand is supposed to be on horseback, we shall form a tolerably just idea of the dramatic art among the Chinese.

Those who have frequented the Chinese sea-ports have been struck with the total absence of probity in the inhabitants. Perhaps in places where the temptation less frequently occurs, this vice is less prominent. There are others which seem to prevail universally; indolence in the upper classes, and slovenliness in the lower. The rich will not even give themselves the trouble to eat without assistance; they have slaves to put their victuals in their mouths. The poor eat every thing they can

[a] "450 French leagues."
[b] Macartney, III. 225.
[c] Muller, Dissert. de Chataia, p. 32.
[d] Macartney, III. p. 359. De Guignes, II. 322, &c.
[e] "Enfant au premier acte, est barbon au dernier."
[f] De Guignes, II. 322, &c.
[g] So entitled from a tower of that name on the banks of a lake, near the city of Hang-thieou-fou, in the province of Tche-kiang.

find; all sorts of animals, and even such as have died by disease. In so populous a country, that practice may find the excuse of necessity. To the same cause is to be attributed their exposure of children, a very ancient practice,[a] yet far less prevalent among them than prejudiced travellers have believed. The dead bodies of children which the police of Pekin collect in the streets, are those of infants who have died, and which have been thus disposed of by their indigent parents to avoid the expense of burial.[b]

The Chinese are a set of subjugated and disciplined barbarians. Seldom do they lay aside the humble insinuating air of a slave anxious to please. They rarely betray the slightest appearance of rudeness or of passion. This character partly arises from the total abstinence which they observe from heating diet and inebriating liquors. The use of tea is very general among them. A large vessel of it is prepared in the morning for the use of the family through the whole day. Chinese dishes seem shocking to every European, but it is not owing to any want of art or care in their cookery. Chinese dinners are rendered insufferably tedious by the ceremony with which they are accompanied. In those given by the emperor of China to the Dutch ambassadors, and at which M. de Guignes was present, many salutations and genuflexions were made before the guests could touch such plates as were supposed to come from the hand of the monarch. One day a large and fine sturgeon was brought to these travellers; their appetite was keen; but, before proceeding to use any freedoms, they were under the necessity of complimenting the august fish for a quarter of an hour.

Polygamy is allowed to the grandees and mandarins. The emperor keeps a numerous and well appointed seraglio.[c] Marriages depend on the pleasure of the parents. In order to obtain a wife, presents must be made to her family. Her husband cannot see her till the marriage ceremony is over. The sex is kept in a sort of slavery; the Chinese peasant yokes his wife and his ass together to his plough.[d]

The graves are judiciously placed without the towns on barren hills, where there is no risk of the dead ever being disturbed by agricultural operations. White is the colour used for mourning; the soiling which it so easily contracts is considered as an expression of sorrow, and of a neglect of the ordinary concerns of life. The families offer a sort of worship at the tombs of such members as have fallen under the stroke of death. They assemble round the sepulchral monument on certain days consecrated to the memory of the deceased. The spirits of their ancestors seem indeed to be reverenced as a sort of household gods; an affecting illusion, which shows that the heart has not lost all influence even among the Chinese.

The primitive religion of China appears to have been a branch of shamanism, the principle of which is the worship of the heavenly bodies and other remarkable objects in nature. This ancient religion has been smothered under the numerous sects which have been grafted on it. Among these is the sect of Confucius, often compared to the Stoical system of the Greeks and Romans. Like the latter, it has obtained the preference among men of condition, who perhaps once hoped to convert it into a kind of political religion. But the books of Kong-fu-tse, or Confucius, are full of superstitious ideas. The sect of Lao-kiun or of Tao-tse resembles that of Epicurus. Its founders were fond of a tranquil and contemplative life; but they admit astrology and magic into their creed; they have their monasteries and a sort of worship.

Dissatisfied with these abstract reveries, the multitude listened with ardour to the apostles of brahminism[e] who came from India about the sixty-fifth year of the Christian era. Their doctrine, modified under the name of the religion of Fo, has become that of the majority of the Chinese. It is filled with superstitions, self-accusations, apprehensions, and mortifications, suited to the timid pusillanimous character of most eastern nations. The priests of Fo are called bonzes. Their number is prodigious; it is said that there is more than a million of them in the empire. All of them live by alms. These holy mendicants conceal under their sober garb a sufficient stock of pride and of avarice. Perhaps the Nestorians who, in the eighth century, were disseminated in China, introduced some ceremonies of the Christian worship, which have intermingled themselves with the observances of the bonzes. The bells, the lamps, the salutations, and several other characteristics of the Chinese ritual, seem to favour this opinion. But it is a remarkable singularity in the Chinese worship, that the bonzes never suppose that they give the least offence to their idols by spreading their breakfast tables on each side of their altars. Nothing is more common in China than to see in a temple the good people drinking their tea, or partaking of other refreshments, while little pieces of sweet smelling wood are burning under the nostrils of their god.

The religion of the emperors of the Mantchoo dynasty is that of the Dalai-Lama. These emperors give powerful protection to that pontiff; and, in order to secure the collection of his revenues, they have now caused Thibet to be occupied with Chinese troops.[f]

In so vast an empire, the trade between the different provinces must be of large amount, but we are unacquainted with its nature; and, if we knew it, we should probably feel little interest in the matter. The trade which they carry on with foreign nations is not proportioned to the size and opulence of the empire. In 1806, China exported about forty-five millions of pounds weight of tea, thirteen millions of which were sold to the Americans, one million to the Danes, and the rest to the British; ten millions of pounds of sugar, 21,000 pieces of nankeen, three millions of pounds of tutenague, besides copper, borax, alum, quicksilver, porcelain, laquered ware, tin, vermillion; 300,000 pounds of cinnamon, besides rhubarb, musk, and various other drugs.

[a] Marco Polo, de Reb. Orient. II. 53.
[b] Compare Barrow, I. 281, &c. Bell, III. 323. De Guignes, II. 285—290.
[c] De Guignes, II. 283, &c.
[d] Neuhof, Embassy, Part. II. p. 50. Plate.

[e] Buddhism.—P.
[f] There was a society of Jews at Cai-fong-fou in Honan, who knew nothing of Christ. A Chinese book, giving an account of Christ, was written by a native in the reign of Kang-hi, 1662–1723.—P.

A hundred and twenty-two European vessels, of which eighty were English, thirty-nine American, (if a geographer can be pardoned for once calling these European,) and three Danish, exported these goods. They had brought with them rice, (thirty-six million pounds weight,) cotton, linen, woollen stuffs, glass, beavers', otters' and foxes' skins, sandal wood, areca, benzoin, and various other drugs and spices.[a] These vessels, and those which entered the harbour of Emouy, in Fou-kien, where the Spaniards of Manilla go for nankeens and other cloths, had imported into China 3,380,000 hard dollars.[b] [c] If it is considered that the tea alone amounted to L.3,333,333 Sterling,[d] and that the rest of the exportation could not be valued at less than L.2,083,333,[e] it will be seen that the drain of specie from the western world is much less considerable than is generally supposed. In 1804, 5, and 6, it suffered a progressive diminution. The trade with the Europeans at Canton is in the exclusive possession of twelve privileged merchants called *hannists*.[f] These merchants make immense profits; but a set of greedy mandarins, expert custom-house officers, and wily interpreters, are supported at the joint expense of the hannists and the Europeans. These different classes of persons, and the people of Canton, reap the profits of a trade, the extinction of which would probably be a matter of indifference to the greater part of China.[g]

China might undoubtedly dispense with a great part of her army, which travellers tell us is innumerable. Some call it 1,462,590, others 1,800,000. We shall not attempt to contradict either of these statements. It is equally certain, according to the Chinese, that the imperial fleet consists exactly of 9,999 ships. All this is sufficiently moderate for an empire which contains 333 millions of inhabitants, as his Excellency Tchou-ta-tzin officially assured Lord Macartney.

But what degree of confidence can we place in these enormous statements, when we find that a statistical account, composed by command of the Emperor Kien-Long,[h] only half a century ago, made the number of peasants who were liable to the manorial tax[i] amount only to twenty-five millions; when we find old censuses, which for fifteen centuries, make the population of China fluctuate only between forty-eight and sixty millions;[k] and when, on comparing the tables of population of 1743, given by Father Allerstein, with those of Lord Macartney for the year 1795, an increase of three or four-fold, in certain provinces, is found to have taken place;[l] when, in fine, we may see that each of these estimates labours under evident error, some of the numbers being literal repetitions of others, and other sums out of all proportion?

Cool and impartial men rate the population of China, properly so called, at 150 millions.[m] The army, which may amount to 500,000 or 600,000 regular troops, and a million of nomades of military habits, has nothing formidable but its numerical amount. Bad artillerymen, ignorant of the art of military evolution, and, what is worst of all, destitute of courage and military spirit, the Chinese would probably yield as easily to a moderate European force as they have formerly so often fallen under the invasions of the hordes of central Asia.

The picture which we have now drawn is conformable to the ideas of La Perouse, of Krusenstern, of Barrow, and of De Guignes, and it is supported by the acknowledgments of the missionaries; yet it is condemned by a number of persons who, from the heart of Europe, raise encomiums on China. In the last century, China found her interested and ardent panegyrists in two powerful parties. The French philosophers and the Jesuits vied with each other in extolling the laws and the happiness of that country. The philosophers knew nothing of the subject on which they pronounced a judgment; the Jesuits knew a great deal. But those who reason with impartiality will never prefer the natural religion of Confucius to Christianity; nor will the free and high-minded nations of Europe admire the arrangements of a tyrannical police, the annoyance of a childish etiquette, and "the great walls" which have been erected for interrupting the communications of the human mind.

In the midst of these opinions, dictated by enthusiasm and party spirit, we must particularize those which relate to the pretended antiquity of the Chinese empire. We know that the enemies of the Christian religion have made it an important object of research to discover a people whose records are more ancient than Noah's flood, and more ancient than even the common term assigned as the epoch of the Mosaic creation. The pretended antiquity of the Egyptians and the Babylonians having been reduced to its proper value, they recurred to that of India and of China. The wonders of distant countries were fitted to inspire a greater degree of veneration. China was represented as a highly civilized and flourishing empire 4,500 years before Christ, and if due time is allowed for the formation of such an empire, it must have existed for a period of ten or twenty thousand years. Some ill-informed missionaries, wishing from motives of vanity to display the antiquity of an empire of which they pretended to have made a spiritual conquest, went blindly into the same system, without being aware of the consequences to which it led. A bad historical compilation, translated from the Chinese,[n] tells us that Fohi founded the empire of China about 3000 years before Christ, and that, three centuries after this, Hoang-Ti reigned over flourishing states which were 1660 miles long and 1100 broad.[o]

Unfortunately for such narratives, China herself has

[a] De Guignes, I. 267, 400. II. 351, 360, 369. III. 45.

[b] Renouard de Sainte-Croix, Voyage aux Indes-Orientales, t. III. p. 152, 160. Comp. Humboldt, Essai sur le Mexique, V. p. 151.

[c] "Piastres, en numeraire."

[d] "80 millions of livres."

[e] "50 to 60 millions of livres."

[f] The Hong merchants, or associated merchants.—P.

[g] The American trade at Canton, 1824—5, was of imports $8,902,045, specie $6,534,500; exports to the U. States $7,716,444. *Singapore Chronicle.*—P.

[h] Dai-syn-y-tundschi, translated from the Chinese into Russian, and thence into German. Busching's Géog. Mag. XIV.

[i] "L'imposition fonciere." Land tax.

[k] De Guignes, Observations sur le Dénombrement de la Chine Journ. des Savans. Mars, 1780, p. 155, &c.

[l] See the tables subjoined to this Book.

[m] The population of China within the walls, from the most recent accounts, amounts to 148,000,000, extended over 700,000 sq. leagues. The army consists of 1,288,000 men, viz. 830,000 infantry, 420,000 cavalry, and 33,000 marines. *O. Martucci.*—P.

[n] L'Histoire Générale de la Chine, en 12 vol. trad. par le P. Mailla et l'abbé Grosier.

[o] "600 by 400 Fr. leagues."

produced historians candid enough to reject all the fables concerning Fohi and Hoang-Ti. They do not even venture to vouch for the traditions respecting the reign of Iao, probably an allegorical person, whose era is fixed twenty-three centuries before Christ. Let us consider in what the great actions of Iao consisted. He drained marshes, he hunted down wild beasts, he cultivated a desert country, and so narrow were the dimensions of his territory that he surveyed the whole four times in the year.[a] Ten centuries after this, we find the princes of China moving from province to province, accompanied by all their subjects nomadic like themselves, and living all alike either in caves of the rocks or in cabins of earth.[b] In the time of Confucius the whole of China south of the Blue River was still a desert.[c] Nothing in the Chinese annals of that period affords any evidence of a great nation. There is no authentic monument to attest the power of those who erected it. The books, written on very perishable paper, and very frequently recopied, can give no information worthy of our confidence. Besides, we are told that, two centuries before the Christian era, a barbarous monarch caused all the writings then in existence to be destroyed. We must then, with the learned among the Chinese, give the history of China no farther extension than eight or nine centuries at most before Christ.[d] The hypothesis which finds it entitled to any higher antiquity owes its origin to the caprice of some modern literati, and the vanity of the emperors.[e]

But we may be told that astronomical observations, allowed by M. de la Place to be exact,[f] are as ancient as 1100 before Christ. Laying aside the objections to which the authenticity of these observations is liable, admitting that they are not composed by modern Chinese, they only prove that 1100 years before Christ a civilized tribe and town existed which produced men of science. Eastern Asia may, like Europe, have had her Greeks and her Athenians. There is a great difference between that and the formation of an immense empire. From 1100 to 2300 there is also a long space of time. A shorter interval witnessed the rise, the civilization, and the extinction of Greece and of Rome.

Even subsequent to the commencement of our era, China has often been divided into small states; and, if her civilization is of more ancient date, it must oftener than once have perished; for in the thirteenth century the inhabitants of the province of Fou-kien in Mangi or southern China, ate with avidity the flesh of their fellow creatures, nicely preferring that of persons in good bodily condition; drank the blood of their prisoners of war; and marked their skins with hot irons like the most savage nations.[g] The person who relates these facts had the management of a district of the country. It is a remarkable circumstance, that from Marco Polo to M. de Guignes, all who have seen China have observed facts so universally tending to assuage the enthusiasm of those who cherished at a distance an admiration of China. We may praise the character of her policy in some particulars. The politician of Europe may contemplate with mixed admiration and disappointment the unyielding conviction entertained by the government of the hazard of giving access to the influence of our political intrigues; and the moral philosopher may admire the cool and considerate theories by which they explain and account for the errors both of one another and of other nations, so favourably contrasted with the mysterious reprobation of crime and boastful displays of forgiveness which have so often rendered European, and especially Spanish, manifestoes ridiculous, and he may view with approbation the firmness with which they execute such acts as appear expedient for the safety of the state and social order. How have they acquired a tone so dignified, and so unlike that barbarous incapacity for thinking which in other particulars they betray, and that inhumanity which marks many parts of their practical proceedings? What are the means by which the more respectable materials of the national character admit of being improved, and incorporated into a consistent system of social felicity? By what means can a condition thus formed become secure against the ambitious intermeddlings of other powers, consistently with a liberal interchange of social advantages? and finally, by what steps might such materials be adopted by those who at present value nothing so much as original genius in its free, romantic, and impassioned exercises, without weakening their mental vigour? These are problems of great interest to the citizen of the world, who flatters himself that some Utopian state of society is within the reach of his species, while he is solicitous to exclude from his contemplations the reveries of idle imagination. Such a person can have nothing in common with those who entertain a spirit of bitter animosity towards the Chinese, and speak and write as if it were somewhat unfortunate that so singular a nation ever had existence. Yet a candid wish to acknowledge their virtues need not be suffered to generate a blind credulity in the ridiculous pretensions which have so often been urged in favour of this nation.

[a] De Guignes, fils, Reflexions, &c. Annales des Voyages, VIII. 176. Le P. Ko (Chinois) Mem. des Missionaries, I. 213. Amyot, ibid. XIII. p. 171, 311. &c.

[b] Le Chy-King, Mem. des Missionaries, I. p. 168. Le P. Cibot, ibid. XV. p. 34. De Guignes, Voyage à Pekin, I. p. 73.

[c] Mem. des Mission. XIII. 311.

[d] Le P. Prémare, preface du Chou-King, p. 55. Le P. Ko, Mem. des Miss. I. p. 240.

[e] Le P. Gaubil, Obs. Mathem. de Souciet, II. p. 16, 17.

[f] Système du monde, p. 398, 405, trois. edit.

[g] Marco Polo, de Reb. Orient. II. 67.

Table of the Population and Revenue of China Proper, from the Chinese Geography, Dai-syn-y-tundschi.

Provinces.	Number of Peasants subject to contribution.	Tribute of Wheat in Chinese bushels or dân. (a)	Tribute of Silver in lâna. (b)
Pe-tche-li . . .	3,340,544	118,162	2,422,128
Kiang-nan . . .	4,256,712	189,124	5,327,614
Shan-si	1,799,895	110,054	2,973,242
Shan-ton	2,431,936	1,271,494	3,463,224
Ho-nan	2,527,456	249,476	2,605,191
Shen-si	2,262,438	191,955	1,450,711
Kan-tcheou . . .	451,693	520,618	300,506
Tche-kiang . . .	3,124,798	1,363,400	2,856,719
Kiang-si	337,069	942,065	1,975,711
Hou-quan . . .	752,970	609,501	1,308,769
Sy-tchouen . . .	650,208	. . . . .	656,425
Fou-kien	1,528,607	297,462	1,030,712
Quan-tong . . .	1,201,320	114,579	1,286,198
Quang-si	220,690	67,755	375,974
Ioun-nan	237,965	227,626	209,582
Quoi-tcheou[c] . .	41,089	123,015	118,094
	25,165,390	6,396,286	28,360,800

Old Statements of the Population of China.

	Families.	Mouths. (d)
Census in the first century	12,233,062	59,594,978
A. D. 740, under the Tang dynasty . .	8,412,800	48,143,600
A. D. 1393, under Hong-Vou	16,052,860	60,545,812
A. D. 1491, under Hiao-Tsong	9,113,446	53,281,158
A. D. 1578, under Van-Lie	10,621,436	60,692,856

a The dân is equal to 12,070 cubic inches French.
b The lâna, according to some, is equal to 709 Dutch *as*, and, according to others, to 772 or 781.
c The present number of provinces in China is nineteen.—P.
d The term used technically in China in these statements, as *souls* is in Europe.

Modern Statements of the Population of China.

	According to Allerstein, 1743.		Macartney, 1795.
		Mouths.	
Fong-tien		668,852	. . . . .[e]
Pe-tche-li		15,222,940	38,000,000
Kiang-nan, divided into			
Gan-hoei	22,761,030	45,922,439	32,000,000
and Kiansou	23,161,409		
Kiang-si		11,006,604	19,000,000
Tche-kiang		15,429,690	21,000,000
Fou-kien		8,063,671	15,000,000
Hou-quang, divided into			
Hou-pe	8,080,603	16,910,423	27,000,000
and Hon-nan	8,829,820		
Shan-ton		25,180,734	24,000,000
Ho-nan		16,332,507	25,000,000
Chan-si		9,768,189	27,000,000
Chen-si, divided into Si-ngan		7,287,443	18,000,000
and Kan-sou		7,412,014	12,000,000
Se-tchouen		2,782,976	27,000,000
Kouang-tong		6,782,975	21,000,000
Kouang-si		3,947,414	10,000,000
Youn-nan		2,078,892	8,000,000
Koei-tcheou		3,402,722	9,000,000
Total		198,213,713	333,000,000[f]

e This province being in Tartary, is not included separately in the last enumeration.
f In 1687, there were in China, 373,953 persons above 70, (those between 70 and 80, in 7 provinces out of 16, not enumerated.) There were 169,850 over 80. All above 70 were exempted from public service, and aided by an allowance, increasing with their age, if impoverished.—P.

BOOK XLV.

THIBET.

The western, the northern, the central, and the eastern regions of Asia have, in the twenty preceding books, passed before us in successive review. Its southern parts still remain, the countries of the Indus, the Ganges, the Bramapootra, and the Irawaddy. All these rivers have been thought to descend from a plateau possessing a southern inclination, but separated by immense mountains from the rest of southern Asia. This plateau is Thibet. Here we approach a mysterious and sacred country, the cradle of more than one system of religion, and in the bosom of which, the seat of perpetual winter, the throne of superstition has been erected. But we must wait for a time till geographical investigation shall be admitted to profane that holy land, where the pretended vicegerent of the Almighty holds his sway amidst rocks, forests, and convents.

Thibet, known to us since the thirteenth century,[a] continued long inaccessible to European travellers. Marco Polo did not enter the country; yet he has given a very curious description of it. According to him, Tebeth contained eight kingdoms; part of it had been devastated by the armies of Kublaï-Khan. It abounded in wild animals; and travellers, in order to protect themselves from their attacks, set fire to the forests of large reeds, (*i. e.* bamboos,) with which the country was covered. In the inhabited parts several strange customs prevailed. The natives did not choose to marry women who had preserved the treasure which in other countries husbands so highly prize. They entreated strangers to initiate their young women in impure gallantry, and to leave with them trifling presents, as memorials of their transitory intercourse. The females hung these trophies round their necks; and the greater the numbers which they could display of them, the more certain were they of establishing themselves by marriage. The country yielded gold, musk, and coral.[b]

On the west of Tebeth, Marco Polo placed the province of Canicloo, or Ganicloo, where there was a lake rich in pearls. It contained many of the musk animals, which they called *gaddery*, mines of turquoises and of gold, and several aromatic plants. This country seems to answer to that of Gang-Desh mentioned in the Zenda-Vesta and in Ferishta, and was once considered as the country of the Ganges from its sources to its cataracts.[c] It is terminated on the east by the river Brius, probably the Bramapootra, or Brihmapootra, which carried down gold dust mingled with its sand. Beyond that river lay the province of Caraiam, the capital of which was called Iacy. That country, rich in horses, in gold, and in rice, was infested by enormous serpents. The inhabitants spoke a peculiar language; they drank a spirit distilled from rice. The great khan made war on the king of Mien (*i. e.* Ava) and of Bangala (Bengal) for the country of Caraiam. He took possession of it, as well as of Botia, immediately adjoining.[d] Botia was evidently the modern Bootân; and this Caraiam, which commentators have hitherto carried as far west as Little Bukharia, must be the country of Assam with its ancient capital Azoo. Perhaps the name of Caraiam has some relation to that of the Garrow mountains. In a neighbouring province called Ardondam, or Arcladam,[e] or Caridi,[f] the men confined themselves to bed for forty days after the delivery of their wives, and had the care of the infant committed to them. The only objects of their worship were the spirits of the ancestors of their respective families. Gold abounded to such a degree, that every man wore a small plate of that metal as a cover to his teeth; and they exchanged it for an equal weight of silver, which was brought to them by the inhabitants of the country of Mien, and was not found at all in that of Caridi. Their sorcerers pretended to cure the sick by magic songs, to which they danced with hideous contortions, till one of them, seized with the influence of the demon, fell down and declared by what sort of sacrifices it was necessary to conciliate the goodwill of the spirit who dictated his words. These are exactly the juggleries of the present Shamans. The capital of the province of Caridi was Nokian.[g] This is the name of a great river which runs from Thibet into Ava. Thus the country of Caridi is the south-east point of Thibet, and perhaps the country of the *Kariaines*, a nation which is spread over Ava. Marco Polo also mentions the town of Cianglu, or Cangloo,[h] which seems to be the Dsanclo of the map of the missionaries.

Such is the substance of the interesting account of Marco Polo, hitherto treated with undue contempt. It is more instructive than that given by Father Andrada in 1626; and it was not till the first half of the eighteenth century that the missionaries of Pekin collected more certain information. Horatio Della Pinna, a capuchin, spent eighteen years in the capital of Thibet, but his observations were not judiciously directed.[i] Two rapid visits of the English, sent out on an embassy to one of the ecclesiastical princes of southern Thibet, that of Mr. Boyle in 1774, and that of Captain Turner in 1784;

[a] It is called Τιμπιτ and Τουναr in the Byzantine history. Wahl, Ostinden, I. 187.
[b] Marci Pauli, de Reb. Orient. lib. II. cap. 36, 37. edit. Muller. cap. 85. edit. 1508.
[c] Wahl, p. 239—242.
[d] M. Polo, de Reb. Or. lib. II. cap. 39, 40, 42, 43. Muller edit.
[e] Ibid. edit. of Muller, cap. 41.
[f] Ibid. edit. of 1508, cap. 89.
[g] Edition of 1508. *Unchian* in Muller.
[h] Edition of 1508. *Cangloo* in Muller.
[i] Horatio della Pinna, Relazione della missione del Thibet. Rome, 1742, (4to.)

some information derived from manuscripts in the language of Thibet found among the Kalmuks,[a] and some verbal accounts given by Russian subjects professing the religion of the Dalaï-Lama;[b] these constitute all the sources of our information concerning this singular country, so interesting both in its physical and its moral aspect.

Under the name of Thibet we comprehend all the countries which lie to the north of Indostan, to the east of Great Bukharia, to the south of Little Bukharia, to the south-west of Tangut, (taking this name in its strictest acceptation,) to the west of China, and to the north-west of the Birman empire. In this wide range, Little Thibet and the state of Ladaak in the west, as well as Bootân in the south, may be considered as separate countries. The south-east boundary is little known, and in the north there seem to be provinces respecting which we are altogether ignorant.

D'Anville makes Thibet terminate at the 35th degree of latitude, but the Jesuit Tiefenthaler,[c] positively assures us that Great Thibet lies on the north-east of Cashmere, and Little Thibet on the north-west. The shortest road to Cashgar would be to go through Great Thibet, but that not being permitted, they go through Little Thibet, the capital of which, Eskerdon, (Askardon,) is eight days journey from the northern boundary of Cashmere. Beyond it is Shakar. Fifteen days journey beyond this, passing through thick forests, we arrive at the frontier of Little Thibet. The caravans take other fifteen days to reach Cashgar. From these facts the result seems to be, that we may with confidence place the northern boundary of Thibet two degrees at least more to the north than it is situated on d'Anville's maps. The Mus-Tag, or "Snowy Mountains," form, according to the Russian accounts, the northern boundary of Thibet, and these mountains are in latitude 38°. But perhaps these countries, without belonging properly to Thibet, are inhabited by small nomade hordes dependent on the sovereigns of that country. This seems to have been the opinion of the missionaries.[d] Perhaps these countries form what d'Anville has marked Turk-hend on his maps; perhaps also Turk-hend and Little Thibet are the same. Turk-hend seems to mean "Turkestan on the Indus."

The general name of these countries is equally uncertain as their boundaries. The inhabitants call them Pout or Bhout, or adding the termination signifying country, *Bhout-yid*,[e] which appears to mean "the country of the god Boodha." The name of Thebet, Thibet, or Tobbat, known to the Persians and Arabians, does not seem to be used in the country itself. Perhaps it is only a corruption of the Thibetan words, *Ten-boot*, "kingdom of Boot."[f] The Chinese call it *Dschan*; the Mongols, *Baran-Tala*, or "the country on the right," and sometimes include it under the name of Tangut.[g]

Geographers have spoken with admiration of the stupendous chain of mountains of Thibet, but we have not been able to procure a geographical description of their direction or extent. Those on the south-west and south present at first a very steep and very elevated chain, traversed by the Ganges and the Gagra, and called the Sewalick and Gorkah mountains. Several rivers which penetrate it on the west had been considered as branches of the Ganges, but are now ascertained to be tributaries of the Indus. Behind these mountains several valleys and plateaux are extended, partly included in Indostan. Beyond these are the Himmaleh mountains,[h] the Imaus, and the Hemodus of the ancients: they seem to bend in a semi-circular form in a south-east direction from the sources of the Ganges to the frontiers of Assam. To the north of the river Sampoo a parallel chain rises; and still farther north there are several large lakes. The chief elevation seems to be in the centre, to the south of lake Terkiri. It is called Koiran, a name which may be extended to the whole chain, although that of Kantel is given to the western part. Here our present knowledge ends. We do not know if these chains bear the Indian and Chinese name of Kentaisse or Kantaiskan, and the Tartar name of Mus-Tag; these mountains are perhaps detached groups, and Thibet, communicating all along with the Kalmuks and Mongols, perhaps gradually passes into the plateau of central Asia. The principal valleys of this system of mountains lie east and west, and are generally open only on the south-east. Great natural features of this sort are worthy of our attention, even to prepare us for forming a true theory of the earth. Chumularia, near Phari, on the frontier of Bootân, is one of the most elevated peaks. On the west is the peak of Langoor, which seems to be an extinguished volcano.[i]

The chief river of Thibet is the Berhampooter, or Brahmapootra, "the river of Brahma," which receives numerous tributaries in Thibet, and among others the Sampoo. Its course is first east, then south-east for a space of nearly a thousand miles,[k] to the confines of Thibet and Assam, where it takes a turn to the south-west, and seems to suffer a distortion, in order to flow into the sea close by the mouth of the Ganges, with which it is apparently confounded; this lower part of its course is nearly 400 miles[l] long.

The Hoan-Ho and the Kian-Ku also derive their origin from the eastern confines of Thibet. The Irawaddy, the May-Kian of Laos, the great river of Cambodia, and the Nookian, which falls into the sea near Martaban, in the Gulph of Pegu, derive their sources from the eastern part of Thibet.

These mountainous regions contain numerous lakes. The largest is the Terkiri, about seventy miles long and twenty-five broad.[m] The Chinese lamas, to whom we owe the only map that we have of Thibet, have placed several other lakes in the northern parts of the country. We know for certain that there is a very singular one, which furnishes tincal or crude borax. Another to the south of Lassa, and called Palte or Yambro, is in ano-

[a] Georgii, Eremitæ Alphabetum Thibetanum. Romæ, 1762, (4to.)
[b] Pallas, Nouv. Mém. du Nord, I. p. 201, &c. IV. p. 271, &c.
[c] Description de l'Inde, II. p. 18.
[d] Duhalde, IV. p. 464.
[e] Georgii, Alphab. Thibet. 416.
[f] Wahl, Ostindien, I. 188.
[g] Pallas, l. c. I. 202.
[h] Called also Himmala, Hima, and Hemakote.
[i] Alphab. Thibet. p. 447.
[k] "360 French leagues."
[l] "140 French leagues."
[m] "27 by 9 French leagues."

ther respect equally extraordinary. The greater part of its area is occupied with an island. It is, in fact, a vast ditch or canal, five miles and a half broad,[a] surrounding an island about thirty-two miles[b] in diameter.[c] The smaller lakes even in the southern part of Thibet are frozen in winter to a great depth.

The seasons in this country observe a great uniformity both in their respective temperatures, duration, and periodical return. They seem to follow the same divisions as those of Bengal. The spring, from March till May, is remarkable for great changes in the atmosphere, powerful heats, and the frequency of thunder. The rainy season lasts from June to September; heavy rains then fall without intermission, the rivers become enlarged, run with great rapidity, and swell the inundations of Bengal. From October to March, the sky, constantly serene, is rarely darkened by mists or by clouds. For three months of that season the cold is perhaps more rigorous than in any part of Europe. It is of a dry and piercing quality; and, though in the latitude of 26° on the confines of the torrid zone, it vies with that of the Alps under the parallel of 46°.

This rude and frozen climate becomes milder to the south of the Himmaleh. Turner assures us that Bootân, notwithstanding its shapeless and irregular mountains, is covered with a perpetual verdure, and adorned with forests consisting of trees of astonishing size. The sides of the mountains are levelled, laboured, and sown by the industrious inhabitants, and covered with orchards, cornfields, and villages. Thibet Proper, on the contrary, presented to Captain Turner's view nothing but low hills bristled with rocks affording no appearance of vegetation, or arid plains of uniform and gloomy aspect. The cold obliges the inhabitants to seek for shelter in the hollow valleys and in caverns.

The vegetation of Thibet is little known; the most scientific account that we have embraces only the southern part between the parallels of 27° and 29°.[d] Its agriculture has great physical obstacles to contend with. At the approach of winter the valleys are generally under water; yet the rays of an ardent sun soon bring the grain to maturity. The autumn being clear and serene, the farmer spreads his corn on the ground to dry, then employs oxen to tread it. The common species of grain are wheat, peas, and barley. Rice grows only in the southern parts. Turnips, pumpkins and cucumbers are abundant. The greater part of the plants which travellers have noticed are such as are met with also in Europe and in Bengal. At the foot of the mountains are forests of bamboos, bananas, aspens, birches, cypresses, and yew-trees. The ash is remarkably large and beautiful, but the pines and firs are small and stunted. On the snow-clad mountains grows the *Rheum undulatum*, which the natives use for medicinal purposes. The country contains, both in a wild and cultivated state, peaches and apricots, apples, pears, oranges, and pomegranates. Among the plants, shrubs, and under-shrubs, Saunders mentions the *Arbutus uva ursi*, the common whortle-berry,[e] the cranberry,[f] and the *Datura ferox*, or thorn-apple, which is common to China and Thibet, and, like our species, the *Stramonium*, a powerful narcotic. There is a species of *Laurus*, which produces a root called the bastard cinnamon. Marco Polo mentions this production, which is common in every part of Thibet, under the name of zensero or ginger. The *Cacalia Saracenica* serves for the manufacture of *chong*, a spirituous and slightly acid liquor.

Bootân possesses few wild animals except monkies; but Thibet swarms with them. The musk animal finds his home among these icy Alps. He becomes the prey of the ounce, and various other species resembling the tiger; but it is not probable that the true tiger often removes into so cold a country. The bear, the wild horse, and the lion, are also mentioned among the animals of this country.[g] According to Marco Polo, there are some dogs as large as asses. The tame horses are small, but full of spirit and restive. The cattle are only of middling size. There are numerous flocks of sheep, generally of a small breed. Their heads and legs are black, their wool fine and soft, and their mutton excellent. It is eaten in a raw state, after having been dried in the cold air, and seasoned with garlic and spices. The goats are numerous, and celebrated for their fine hair, which is used in the manufacture of shawls. This grows under the coarser hair. We must not omit the *yak* or grunting ox,[h] which nature has furnished with long and thick hair, and a tail singular for its silky lustre and undulating form. In all the east this last is an article of luxury.

Marco Polo had already mentioned that fish are abundant in the lakes of Thibet; the fact is confirmed by modern travellers, and the particulars which they give lead us to think that several of them are species not hitherto known to our ichthyologists. This author says that the lakes also contain coral.

Since the visit paid to this country by Turner, we are in possession of a more extensive acquaintance with its mineralogy. In Bootân this traveller only found iron and a small quantity of copper. Thibet Proper, on the contrary, contains wealthy mines; gold is found in large quantity, as was stated by Polo, sometimes in the form of a powder in the beds of the rivers, at other times in large masses or irregular veins, in a gangue of hornstone[i] or quartz. There is a lead mine two days journey from Teshoo-Lomboo; the ore is galena, and seems to contain silver. The Thibetans work cinnabar mines, which are rich in quicksilver; and they employ that metal as a specific in the same diseases for which it is used in Europe. There are some strong appearances of copper mines. Rock salt is very common; but in general the want of fuel operates as a discouragement to the working of metals.

Mineral waters are abundant. We must take particular notice of that production which is peculiar to Thibet, tincal or crude borax. According to Mr. Saunders, who accompanied Capt. Turner, the lake from which

a "2 French leagues."
b "12 French leagues."
c Alphab. Thibet. p. 451.
d Saunders, in the Philosophical Transactions, vol. LXXIX. p. 79—106.
e "Airelle á fruit noir," *Vaccinium uliginosum*, L. *Vitis idæa*, Clusii.
f "Airelle canneberge," *Vaccinium oxycoccus*, L.
g Alphabet. Thibet. p. 450.
h See a plate of this animal in Captain Turner's account of Thibet.
i "Petrosilex." This term has been applied by the French to compact felspar, as well as hornstone properly so called.

tincal and rock salt are obtained is fifteen days journey north from Teshoo-Lomboo. Surrounded on all sides by rocky mountains, it receives no streams of any kind, but is fed by brackish springs rising from the bottom of the lake itself. The tincal is found crystallized in the lake, and is taken up in large masses, which are then broken for the convenience of carriage, and exposed to dry. This article, though gathered for a considerable length of time, has no appearance of suffering diminution, and most probably is continually formed anew. The lake is said to be at least twenty miles[a] in circumference. It is frozen over for a great part of the year. In Thibet tincal is employed for soldering, and as a flux for promoting the fusion of gold and silver. At some future period many natural curiosities will undoubtedly be found in these mountainous regions. A large harvest awaits in this quarter both the painter and the naturalist. From what we know already of Thibet, it seems to be another Switzerland on a larger scale. On the north of Tassisudon, Mr. Saunders observed a singular rock, which in the front view formed six or seven pilastres of large circumference, and nearly a hundred feet in height. The mass, partially detached from the mountain, projects in a manner highly picturesque over a large waterfall.

The geographical divisions of Thibet are enveloped in much obscurity. The terms, "high Thibet," "middle Thibet," and "low Thibet," seem to be arbitrary and vague. Father Georgius[b] mentions the following provinces: Latak, a kingdom to the west, in which he includes little Thibet; the kingdom of Nagari; Hor, with the lake Terkiri, Kiang, Daum, and the principality of Kahang; these four are in the north; Amdoa (the Ard-Andam of M. Polo,) a kingdom to the east; Brediong or Bramasiong, a kingdom to the south; together with Tacpou, the Bootân of the English travellers, and Combo or Concpo; in the centre of the province of Ou, the Wey of the Chinese geography, and that of Szang or Chang. But several questions may be asked relative to these alleged provinces:—Is Latak a detached sovereignty, as some have maintained?[c] Are not the provinces of Hor and Kiang subdivisions of the kingdom of Nagari? That of Daum seems to be subject to Kahan; that of Combo probably to Tac-po. By these unions we may reduce the number of divisions to eight kingdoms, in conformity with the account of M. Polo. But the mixture of Chinese, Thibetan, and Mongolian names, together with the extreme imperfection of the maps constructed by the Chinese lamas, render any discussion of these points as useless as it would be tedious.

We have little information concerning the towns of Thibet. The greater part of the places marked on the map seem to be nothing more than villages, or groupes of cabins, each surrounding some temple. According to the official Chinese geography, the whole of Thibet contains sixteen towns.[d] Lassa[e] or Dsassa, the capital, is situated in the province of Ou, in a large plain. It is a small city, but the houses are built of stone, very spacious and lofty. It is the seat of the Thibetan government, and of the Chinese mandarins who are appointed as overseers. It is inhabited by merchants and artisans. The famous mountain seven miles to the east of Lassa, on which is the palace of the Great Lama, is called Puta-La, or "the holy mountain." According to the Chinese, this is only the name of the palace, while the mountain is called Mar-Buli. This palace or temple, crowned with a gilt dome, is sixty-two Chinese fathoms in height. The exterior is said to be decorated with numberless pyramids of gold and silver, and the ten thousand rooms of the interior contain an immense number of idols of the same precious materials. Sera is a monastery, with a town, at a short distance from Lassa. In it we may recognise the *Sera metropolis*, mentioned by ancient writers.[f] Teshoo-Lomboo, a monastery in which the second Lama resides, contains three or four hundred apartments inhabited by monks, besides temples, mausoleums, and the palace of the Lama. The buildings are all of stone, with flat roofs, and parapets of heath or small boughs. Capt. Turner also gives a description of some other palaces and strong castles. The forms of the bridges are varied and romantic. Sometimes they are formed of chains extending from one precipice to another; in other cases they are of beams, with one end fixed in the bank on each side, while the other ends advancing with a certain elevation support a small platform, exhibiting altogether the upper section of an octagon.

Tassisudon in the south is the residence of the prince of Bootân, a vassal to the Lama of Teshoo-Lomboo. Latak in the west, the capital of the kingdom of that name, is said to be a large town. We have mentioned Cianglu or Dsancloo from Marco Polo. The same traveller mentions a town called Sook or Sookoor, near which the true rhubarb grows. Forster considers this as belonging to Thibet.[g] We have already mentioned it in speaking of Tangut, as well as that of Selim or Serin, a trading place frequented by the Chinese.

Little Thibet seems to be a country physically and politically distinct from great Thibet, and is situated to the north-west and north of Cashmere. Ascardo or Eskerdon is its capital. The two leading streams which form the Indus take their rise in this country, or at least flow through it, one from the north-west, and another from the south-east, and meet in a point, and the river formed by their union runs a long way in a westerly course, passing through the range of the Hindoo-Coosh, retaining the same direction for a great way before it assumes its principal direction, which is south and a very little west. The geography of the upper part of the Indus has been only of late understood; the stream which runs from the south-east, being formerly only known in the upper part of its course, was supposed to be one of the sources of the Ganges, and thus we find it delineated in many maps. The city of Ladak is situated at the confluence of the two rivers, the one from the north-west, and the other from the south-east. In some maps we find another river farther south, running from the south-east parallel to the one

[a] "7 Fr. leagues."
[b] Alphab. Thibet, p. 417.
[c] Desidéri, Lettres édifiantes, t. XV. Astley's Collection of Travels, t. IV. p. 453
[d] Dai-syn-y-tundschi, in fine.
[e] Lhassa.
[f] Pallas, Mém. du Nord, 1. 206.
[g] Forster, Voyages au Nord, t. II. p. 382.

last mentioned, and joining the united river formed by the two last; and this parallel stream receives the name of the Indus. The Sutledge is another river, which rises near the mutual boundary of Great and Little Thibet, crosses the Himmaleh range about two degrees and a half to the south of Cashmere, and sends its waters across the Punjaub to fall into the Indus. Merchants from Cashmere repair regularly to Yarkand in Little Bukharia, passing through Little Thibet. They rendezvous at Ladak, from which they travel chiefly along the north-west tributary of the Indus.[a] [b]

Little Thibet seems to include several provinces famous in the accounts of the earlier travellers, and of the ancients. The country of Beloor, situated to the east of Badakshan or Balascia, contained mountains covered with eternal snow. Some savages wandered in the midst of immense forests; but between these chains of mountains a wide plain was described as opening, in which a number of streams met to form a magnificent river bordered with rich meadows, in which flocks of antelopes bounded; and where a horse, previously emaciated, would recover his vigour in a few days. This plain was called Pamer, or rather *Panir*,[c] "the country of springs."[d] In this description of M. Polo, we can scarcely fail to recognise the north-west extremity of Little Thibet, where one of the streams which form the Indus takes its rise. We find in this same country, but on the opposite side, or to the S. E., Parestan with the town of Pader,[e] where we have placed the *Padæi* of Herodotus, and the *Pariani* of Mela. The name of Baltistan,[f] or in Sanscrit *Baladeschan*,[g] which seems to include the whole of Little Thibet, reminds us of the *Byltæ* of Ptolemy. This whole country belongs to India as known to the Persians, to Herodotus, and to Ctesias. It has been considered as the *Serica* of a later period, though Mr. Murray gives strong arguments to show that Serica must have been situated much farther to the east.[h]

It is very probable that many of the customs described by Marco Polo are still preserved in the vast provinces of Thibet. Modern accounts contain nothing but insulated and imperfect remarks on the subject. Captain Turner describes the Thibetans as a mild and affable people. The men are stout, and have a little of the Mongol features. The complexion of the women is brown, but enlivened with a mixture of fresh red. The clear atmosphere of the mountains keeps them in good health.

Marriages are concluded without much preliminary ceremony: if the proposal of the lover is approved of by the parents of the female, the latter repair along with their daughter to the house of their intended son-in-law. The friends and acquaintances of the parties form their marriage train. Three days are passed in the amusements of dancing and music; and, when these have elapsed, the marriage is considered as concluded. The priests, debarred from every kind of transactions with females, have no share in the celebration of marriages; but the conjugal union is considered as indissoluble. The husband has not the power of discarding a wife who is disagreeable to him, nor a wife that of leaving her husband, unless the same consent which created the union authorizes the separation, and in that case neither of the parties is allowed to form a fresh connexion. One singularity of Thibet is, that polygamy is allowed in this country in a sense the reverse of that which is customary in other parts of the eastern world. Here the women are allowed a plurality of husbands. The eldest brother of a family has the privilege of choosing his wife; but she becomes the common property of all the brothers, whatever be their number. This system, necessarily so unfavourable to population, existed also among the Nabathean Arabs; but Pallas calls the fact in question.[i]

Rubruquis says that the Thibetans once practised the abominable custom of eating the bodies of those relations who died of old age, and that this when given up was replaced by that of drinking out of the skulls of their ancestors. The moderns make no mention of either of these customs. They tell us that the mortal remains of the Great Lama are preserved in a large shrine; that the bodies of the subordinate priests are burned, and their ashes preserved in small hollow images; while the bodies of the unconsecrated multitude are thrown out to be devoured by birds of prey, in large enclosures encircled with walls.[k]

The common Thibetan language resembles in its numerous monosyllables and the absence of particles and inflections, the wretched idiom of the Chinese. Like the latter, the Thibetans, in order to communicate their

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[a] The account of the rivers given in the original is somewhat different,* and the author refers to Wilford, in the 6th volume of the Asiatic Researches. More precise information has now been obtained by the researches of various British officers. See Mr. Elphinstone on the kingdom of Caubul, and Mr. Hugh Murray's Historical Account of Discoveries and Travels in Asia.—Tr.

[* The account in the original is as follows:—"The Indus rises in the mountains to the N. W. of Yarkand, whence it flows S. till within two days' journey from that city; then it suddenly turns to the E., and makes an immense curve towards *Saighur*, probably the *Sheker* of the maps of D'Anville; it there takes a new direction towards the frontiers of India." Wilford, As. Res. vol. VI.]

[b] The following information has been communicated by Meer Izzut Ollah, an attendant on the late Mr. Moorcroft. Lei, the capital of Ladagh, (Butan, in the Cashmirian language; Tibet, in the Turkish,) is a populous city on the right bank of the Sampo. Its houses are 3 or 4 stories high; its population, Thibetan and Cashmirian. The natives are most of them Buddhists, whose doctrines and worship are said to resemble the Christian; but there are Mahometans, both of the Shiite and Sunnite sects, with only one mosque in common. The government and people are both very tolerant. The rajah is a Mahometan, but he sends tribute to the Gooroo Lama, at Lassa. The productions of the country are wheat, barley, and cotton; but the soil is scanty. They export shawl wool to Cashmire. About 800 horse loads are brought from Rodauk, a dependency to the S. of E., and from Cha-Yin-Than, a dependency of Lassa, to the E. (Lassa is E. two months journey.) The people are very unwarlike. They are much afflicted with goitre and dyspnœa. They dress in woollen. They make a very fine gunpowder. Nitre is abundant. They have printed books, and manuscripts. Their language is said to resemble the Turkish and Cashmirian.—P.

[c] MS. quoted by Muller, in M. Polo, de Reb. Orient. I. 37.

[d] From *Pan* or *Panir*, water, or spring, in Sanscrit, (*Vand* in Danish.) The country called *Vanda-banda* by Ptolemy, perhaps derives its name from the *union of waters*. The *Paropamisus* or *Parpanisus* of the ancients is *Para-panis*, "the mountain of springs or rills."

[e] Map of Cashmere, by Le Gentil, Ayen Akberi, II. p. 152. Tiefenthaler, I. 50. (in German.)

[f] Lettres édifiantes XV. 188.

[g] Ezourvedam, II. 118.

[h] See note, p. 368.

[i] Duhalde, IV. 572. Pallas, I. 217.

[k] The same practice is observed by the Parsees in Hindoostan. They consider it a religious observance. The Parsees at Bombay have a large circular building for this purpose, open above so as to give free access to birds of prey.—P.

thoughts, are obliged to describe figures in the air or in sand. The Thibetan writings which have been found among the Kalmuks are no where to be paralleled for obscurity.[a] Their works on religion are written in a sacred language,[b] approaching to the Sanscrit. Rubruquis had mentioned previously to Capt. Turner, that the Thibetans write like the Europeans from left to right.[c] They give the name of *uchen* to the characters which they employ for printed works; those which are employed for correspondence and other ordinary purposes are called *min*. Both are alphabetical letters, but accompanied with numerous contractions which give them something of a syllabic nature.[d e] The Thibetan year is lunar, and the month consists of 29 days.

The industry of this people finds exercise in the manufacture of shawls or woollen stuffs. The elegant goat's hair of which the shawls are made is mostly exported in a raw state to Cashmere. The Chinese procure from Thibet pale gold dust, coral, lambs' skins, musk, and woollen stuffs. They sell their tea and their porcelain to the Thibetans. To Nepaul Thibet sends rock salt, tincal or crude borax, and gold dust; and receives in exchange silver coin, copper, rice, and coarse cotton stuffs. Through the medium of Nepaul, Thibet formerly carried on a trade with Bengal in gold dust, borax, and musk; the returns consisting of cloths, spices, sail cloth, emeralds, sapphires, lapis-lazuli, and jet. The jealous and timid policy of China, however, has now excluded foreign merchants from this country. No money is coined in Thibet, being forbidden by the principles of the established religion, and the adulterated coin of Nepaul is the common medium of exchange.

The leading feature of Thibet as a country, is that of being the chief seat of a religion which prevails over Central Asia, and the spiritual head of which, the Dalaï-Lama, is also the legitimate sovereign of the country, and collects its revenues, though the Chinese emperors have got absolute command of them by a military occupation of the chief places, under the pretext of a pious protection. The superstitions of Central Asia are divided into three principal branches, Shamanism, Brahminism, and Lamaism. Shamanism has the honour of being the most ancient of the three creeds. It is mentioned by Strabo, Clement of Alexandria, and Porphyry. Strabo gives the professors of it in his time the name of Ghermans, Clement that of Sarmans, and Porphyry that of Samaneans. The Shaman priesthood cultivated the study of philosophy, and the Brahmins allow that they owe to them all their scientific information. The latter still read the few books of the Shamans which are in their possession, with the same respect which we show to the writings of the Greeks and Latins. But the ancient Brahmins accused the Shaman priests of idolatry, persecuted and expelled them from Indostan. This object they only accomplished by degrees; but in the end they obtained such complete success, that for six hundred years none of the Shaman priests, nor any followers of their doctrines, have been found to the west of the Ganges.[f] The ancient Shamans established no succession in their numberless gods in time or place, and no order of generation. The theogony of the Lamaists, on the contrary, teaches that by means of a mysterious operation executed in the person of the Grand Lama, the same divinity subsists eternally in this supreme pontiff under different human forms which he deigns successively to assume.

Shamanism has given rise to the superstitious opinions and practices which constitute the religion of the ancient Mongols, who, deprived of the use of written language, have preserved it by tradition. To this system we must also refer the belief of the idolatrous nations of Siberia, such as the Buriats, the Yakuts, and some Tartars who are neither Mahometans nor Christians. The celebrated idol of the Siamese and Peguans, the same which is also worshipped by other races under different appellations, is called Sommona-kodom. In the Tartar and Persian languages, the termination *kodom* is the word for a god. In the first part of the name, therefore, Sommon, we see the resemblance of Shaman. The Mongols call this idol *Chichimooni*, and the Kalmuks Chakamoona; in Thibet it is called Mahamooni, a Sanscrit term, signifying "the great saint." It is the famous *Chaka* of the Chinese, called *Fo* after he was deified.[g]

"Fo," says the learned Fischer,[h] "seems to us to be the *Bod* or *Budha* mentioned by St. Jerome. Bod seems to mean deity in general; and Bod-et-tan or Boodistan, the name given to the kingdom of Thibet, signifies 'the divine country.'" My opinion is, that the B has been changed into F by the Chinese; for neither the Thibetans nor the Mongols have this last letter in their alphabet. The word *Bod* makes its appearance in different ways in India and Mongolia. *Paooti-Ziat* (which signifies lord Paooti) is a name frequently given to the idol Sommona-kodom. *Be* is the name which the Buriats give to their diviners or sacrificing priests. On the banks of the Ganges the term Boodha is used to express the day which corresponds to the third of our week. Boodha Faran is the term applied to it in Sanscrit; and the expressions Boodha-Iedina, Fan-Paoot, Booda-Kirooméi, signify the same thing among the people of Candi in Ceylon, of Siam, and of Malabar. From these circumstances it appears that Sommona-kodom, Chighimooni or Chichimooni, Chakchimona, Chaka, Foh, and Boodha, are the same deity under different names.

La Loubère, a judicious writer and enlightened scholar, maintains that the word *Shaman* is derived from the *Pahli* language, or that in which the sacred books of the Siamese are written, and signifies a hermit. This etymology is in conformity with the following passage of Clement of Alexandria on the Sarmans: "There are hermits which do not live in towns or even in houses; they clothe themselves with the bark of trees,

[a] Muller, Descript. Tangut. in Sibir. repertis, 1747. Petersb. Bayer, Mus. Sin. Pref. p. 109. Georgii, Alphab. Thibet.

[b] Probably the Pali, in which the sacred books of the Buddhists are generally written.—P.

[c] Rubruquis, ch. 37.

[d] Cassiano Beligatti, Alphabetum Tangutan. s. Thibetan. Rom. 1773.

[e] According to Moorcroft, there are fourteen kinds of letters or alphabets used in Thibet. The literature of Thibet is very voluminous. A standard work found in all their monasteries, consists of 108 folio volumes, each 30 inches long by 6 broad. The first volume contains 1088 pages. In the Tanshar monastery, there were 320 volumes of Thibetan books, all translated from the Sanscrit. (*Koros.*)—P.

[f] Pétis de la Croix, Histoire du Christianisme dans l'Inde, liv. 6.

[g] Pallas, Mém. sur les peuples Mongols, II. p. 6.

[h] Fischer, Histoire de la Sibérie, extrait par Stollenwerck.

live on the spontaneous produce of the earth, and drink water out of the palm of the hand."

The opinion of D. Kæmpfer does not differ very widely from this. He says that *Shaman* signifies a man exempt from passions.[a] Besides this, the denominations of Shaman and Talapoin have the same meaning: the first belonging to the Pahli language; the second to the common colloquial language of Siam.

Fischer gives a more modern origin to the religious system which prevails in Thibet, or Dalaï-Lamaism; he finds in it a mixture of Buddhism, with the corrupted Christianity of the Nestorians. The Thibetans themselves do not trace their authentic history farther back than the year 790. The travellers of the thirteenth century knew nothing of the Dalaï-Lama. Rubruquis seems to have had some knowledge of him,[b] but he speaks chiefly of the fanaticism of some Nestorians, to whom he gives, for a spiritual head, a bishop, whose residence[c] was in a town of China called Seghin. He also mentions another worship practised among the idolaters, whom he calls Touinians, and whom he at the same time considers as Manichees.[d] Marco Polo mentions a Chinese town called Zun-Ghoui, the inhabitants of which he considers as Nestorian Christians.

Carpin takes the Oigoors for Christians who followed the Nestorian heresies,[e] and the Jesuit Gaubil, adopting the same opinion, asserts the Eygoors or Oigoors to be Christians.[f]

Many other writers assert that the Christian religion is spread through Tangut, China, and the countries occupied by the Mongolian nations, and has had its zealous partisans in the bosom of the reigning dynasties.

Yet, according to all accounts in which the present state of these countries is described, no traces of Christianity subsist among them, with the exception of China, where that religion was preached anew by the modern missionaries of the church of Rome. The religion of the Dalaï-Lama, on the contrary, is preserved, extended, and established among the people of Tangut, in Mongolia, in the Kalmuk country, in certain kingdoms of India, and even in China. Might it not be supposed, says Fischer, that Nestorianism was anciently introduced into upper Asia; and that the priests who propagated this heresy, and their proselytes, deprived at so great a distance of all intercourse with societies really Christian, departed farther and farther from Christianity, and gave themselves up to the superstitious practices of the people among whom they lived, till every trace of the Christian character was effaced?

According to this hypothesis, which we consider as demonstrated, Lamaism cannot boast of an ancient origin. It is made up of ideas taken from the doctrine of the ancient Shamans, and usages belonging to the more modern worship of the Christians. From the former it adopts the opinions relative to Fo, and the transmigration of souls; from the latter its rites and observances. Lamaism and Christianity, (at least the Christianity of the church of Rome,) have striking features of mutual resemblance.

"As for the rites and ceremonies of Thibet," says Captain Turner, "so far as I have been able to judge, they differ essentially from those of the Hindoos. The Thibetans meet in chapels for their religious services; there they sing alternately and in chorus, accompanied by noisy instruments. Indeed I never have been present at their worship without being struck with the resemblance which it bears to that which I have seen and heard in Romish churches." Their monks go with the head shaved. They have their female nunneries. The dress of the Gilons has a great resemblance to that of European priests. These resemblances, which some have employed as arguments against the divine origin of Christianity, ought all to be regarded as traces of Nestorianism.

Thibet resembles Rome also in another particular. It was subject for some time to secular princes called Tsan-Pa; the Lama resided at Lassa, with a power resembling that of the spiritual prince of Japan. The Eleut Kalmuks subdued this secular prince, and transferred his power to the Lama.[g] Differences arose between the old or red lamas and the yellow lama, who by the influence of China obtained the ascendancy. In 1792, the people of Nepaul having committed great ravages in this country, the emperor of China sent an army to the assistance of the Grand Lama; since which period a chain of military posts prohibits all intercourse between Bengal and Thibet, to the great disappointment of the English nation and of geographers.

The Lama was in the practice of naming a *tipa* or secular ruler, who is now replaced by a *gioon-wan* or prince-governor sent by China. The laws of Thibet, like its religion, have a great conformity with those of the Hindoos. There is no census to show the population of this country. The Chinese reckon 33,000,000 of inhabitants, probably ten times the real number. The population ought constantly to diminish, if it is true that the number of men exceeds that of women. If we may form an opinion from the facility with which the Kalmuks conquered Thibet, we should suppose that this country cannot raise an army of 50,000 men. Its revenues may be concluded to be in proportion to the poverty of the people.

But this prince, whose temporal power is so limited, is the visible divinity of a great part of Asia. He is the Fo, the Buddha himself, clothed with the human form. The divine spirit is supposed after quitting one body to enter a new one; and thus under a succession of forms the head of the church keeps up the miracle of his perpetual existence. It is said that a heavenly odour is exhaled from his whole body; that flowers grow beneath his footsteps; and that in the most parched desert springs flow at his word of command. It is a certain fact that the refuse excreted from his body is collected with sacred solicitude, to be employed as amulets and infallible antidotes to disease.[h]

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[a] Hist. du Japon, I. p. 46. édit. d'Amsterdam, 1732, in 16mo.
[b] Voyage du Rubruquis, ch. 26.
[c] Id. ch. 28, 47.
[d] Id. ch. 48.
[e] Voyage de Carpin, art. 5. p. 40.
[f] Observations Mathématiques, &c. édit. du P. Souciet, I. p. 224.

[g] Duhalde, t. IV. p. 50.
[h] "Il est hors de doute que le contenu de sa chaise percée est dévotement recueilli; les parties solides sont distribuées comme des amulettes qu'on porte au cou; le liquide est pris intérieurement comme une médécine infaillible." See Pallas, I. 212.

This mysterious personage has appeared to many of the learned to have some connexion with the famous Prester John, whose celestial and immortal kingdom so much occupied the attention of the geographers and historians of the middle age. The plausible reasons by which these views are supported are the following: Three travellers, Carpin, Rubruquis, and Marco Polo, have spoken of Prester John, and each in his own way. Carpin represents him as a king of India.[a] Rubruquis gives him the same title, and assigns to him the horde of the Naimans as his spiritual kingdom, which horde, he says, professes the Christian religion.[b] Marco Polo agrees with the Franciscan monk in giving this prince the denomination of Ounk-Khân,[c] and in making him a Christian. Ounk-Khân seems to signify "great prince," as explained by the Chinese language. This name has been given in a particular manner to a Kalmuk prince celebrated for his conquests, but to whom none of the received notions of Prester John or Prete-Ianni are at all applicable. This word, which by the meaning which it appeared to express in the Italian or French language led the travellers into an error, ought undoubtedly to be explained by some oriental language. Of all the etymologies which have been contrived, one of the most plausible is that of Scaliger,[d] who considers the name as of Indian origin, and with some alteration representing the words *prestĕ-ieghan*, (*preste-ghiani* or *hiani*,) which signify the "universal messenger," the "apostle of the world."

It is well known[e] that the Nestorian patriarchs assumed the title of catholic or ecumenical, a title which in some measure corresponds to the last mentioned interpretation of Prester John. If therefore we suppose (and what well informed man would dispute the point?) that the Nestorian missionaries penetrated a very great way into the high regions of Asia, we shall be led by the analogy of the names to consider the chief of these sectaries as the pretended sovereign pontiff of Marco Polo and of Rubruquis; and, as all writers testify that Prester John presided over a Christian community, the inference will be, that he was the patriarch of the Nestorian church, or else a bishop delegated by this patriarch, who, exercising a supreme power at a distance from the head on whom he was dependent, received or claimed the proud title of Universal, Catholic, and Ecumenical, though not due to his rank. We are tempted to consider this Nestorian patriarch as the same person with the Dalaï-Lama. It is only since the reign of Kaiuk-Khan, grandson to the celebrated conqueror Genghiz, that we hear at all of the word Lama, or Dalaï-Lama,[f] in Mongolia, the country in which Prester John is said to have held his double empire.[g] Father Andrada (in 1624) was the first European who made mention of the Dalaï-Lama;[h] and Bernier speaks of him as an extraordinary personage who was imperfectly known.

It remains to be observed, that the writers of past ages who treated of the Nestorians and Prester John say nothing of the high-priest of the Lamaists; and we perceive, on the other hand, that in proportion as this last personage begins to produce a sensation, the Nestorian name begins to be forgotten among the inhabitants of Mongolia and Thibet. What conclusion are we to draw from all these considerations? Only that a universal patriarch attracted a sort of veneration and renown under a foreign name, or most probably under his proper title translated into another language. The expressions of universal patriarch, Prêtre-Jehan and Dalaï-Lama, may then denote the same person and the same dignity. But as Rubruquis and Marco Polo place the kingdom of Prester John on the track which they traversed, and consequently in Mongolia, and at a great distance from Thibet, it appears still more natural to recognise in this sovereign pontiff only a momentary object, a Nestorian bishop who by his talents held a great ascendancy over some tribe of the Mongols. Fame, which exaggerates every thing conspicuous, may be allowed to have created the remainder.

On the west of Little Thibet we find a small country which merits our notice chiefly on account of the singularity of its inhabitants in manners and opinions.[i] They seem to be independent, but they are more naturally connected with the subject of the present book than with any other. The country has received from the Bukharians and Afghâns the name of Caufiristan, and the people that of Caufirs, a term which signifies infidel, and is intended to distinguish them from the believers of the Koran.

Caufiristan occupies a great part of the range of Hindoo-Coosh adjoining Afghânistan, and a portion of Beloot-Tag. It is bounded on the north-east by Kaushkar, (a different country from Cashgar in the Kalmuk country,) on the north by Badakshan, and on the west and north-west by Balk. On the east, it extends for a great distance towards the north of Cashmere, where its boundary is not exactly known. It is an Alpine country, composed of snowy mountains, deep pine forests, and small but fertile valleys, which produce large quantities of grapes, and feed flocks of sheep and herds of cattle, while the hills are covered with goats. The grain is inferior both in quality and abundance. The common kinds are wheat and millet. The roads are only fit for travellers on foot, crossed by many torrents, which are passed by means of wooden bridges, or swinging bridges made of ropes of osier. The villages are built on the slopes of hills, the roof of one row forming the street of the row above. The valleys are well peopled. Camdaish, the capital of the Caumojee tribe, consists of 500 houses; and the tribe has ten villages.

The people have no general name for their nation. The Mussulmans distinguish them into the Seaposh (*i. e.* black vested) or Tor (black) Caufirs, and Speen or white Caufirs, epithets taken from their dress. All of them are remarkable for fair and beautiful complexions, but those of the largest division wear a vest

[a] Carpin, art. 5. p. 42.
[b] Rubruquis, ch. XIX. p. 36.
[c] Marco Polo, liv. VI. ch. 61, et 64.
[d] Scaliger, de Emendatione Temporum, p. 627.
[e] Renaudot, Anciennes Relations de l'Inde et de la Chine, p. 238, &c.
[f] Rubruquis, ch. 19. Marco Polo, liv. 1. ch. 51.
[g] Gaubil, p. 105, et 143, à la note
[h] Duhalde, t. IV. p. 176.
[i] See Mr. Elphinstone's Account of the Kingdom of Caubul, Appen. p. 617.

of black goat-skin, while the others dress in white cotton. They have several languages, all allied to the Sanscrit. They have all one peculiarity, that of counting by scores, which they square, cube, and multiply constantly by twenty as high as they have occasion, in the same manner as we form hundreds, thousands, and higher numerical powers, by multiplying ten successively by itself. These circumstances are adverse to an opinion which has had some currency, that they are descended from the Greeks, and were left in this country by Alexander. The only feature favourable to that hypothesis is, that they make use of raised seats, and cannot sit in the manner of the other Asiatics. The most general and credible account of them is, that they were expelled by the Mussulmans from the neighbourhood of Kandahar, and, after a frequent change of abode, settled finally in their present territory.

They believe in one God, whom they call *Imra*, or *Dagun*, but venerate numerous idols of stone or wood, which represent great men deceased. They attach the utmost importance to the virtues of liberality and hospitality; these constitute among them the highest claims of future happiness, and even deification after death, while the opposite vices are threatened with hell. They have solemn sacrifices and long ceremonies and prayers, not failing to pray for the extirpation of the Mussulmans, whom they regard with invincible aversion. Their men, young and old, are honoured in proportion to the number of Mussulmans whom they have killed or lamed. They have hereditary priests, who possess but little influence in their community. When a child is born, it is carried with its mother to a house built for the purpose without the village, there to remain for twenty-four days, during which period the mother is considered as impure. The women are separated in a similar manner at certain other periods. The marriage ceremonies are conducted without any function of the priesthood. The women are not concealed; their immoralities are punished, but not deeply reprobated. They have slaves both male and female of their own people. They do not enslave such Mahometans as they take in war, the glory of killing them being much more highly valued. It is in the course of violent contests among the Caufir tribes themselves, and in cases of oppression practised by the strong against the weak, that they make slaves. Persons in the servile condition, however, are not ill treated. They have some peculiar customs connected with their funerals. A strange account is given of their ceremonies of condolence: a person paying a visit to another who has lost one of his relations, throws his cap on the ground when he enters the house, then draws his dagger, and seizing the hands of the afflicted person, makes him rise and join him in dancing for some time round the apartment.

It is uncertain whether they have any acknowledged magistrates: if there are, they possess very little power, every thing being done by consultations among the rich men. The rich are called khans, a word which they have borrowed from their neighbours; but they have no titles properly their own. Their dress consists of goat-skins with the hairy side outermost, or cotton robes. Some have a cotton shirt under their other dress, and they wear cotton trowsers worked over with flowers in red and black worsted. The women have their hair plaited, fastened over the crown of the head, and covered with a small cap and turban. They also wear silver ornaments, and cowrie shells. Their virgins wear a red fillet round the head. Both sexes have ear-rings, bracelets, and rings round the neck, which are sometimes of silver, but oftener of brass or pewter. With the men these ornaments are assumed after the age of manhood, with much ceremony and expensive feasting. They are laid aside on occasions of mourning. The houses are of wood, with cellars for the family stores. Their food consists of dairy, fruits, and flesh, which they prefer almost raw. They wash their hands before eating, and generally begin with some kind of grace. All persons of both sexes drink wine to great excess, but they do not become quarrelsome in their cups. Their arms are a bow with barbed and sometimes poisoned arrows, and a dagger. They have lately learned the use of fire arms and swords. They generally fight by ambuscade. The Mahometan nations are those with whom they are most habitually at war. When pursued, they unbend their bows, and use them as leaping poles, by which they bound with the utmost agility from rock to rock. The Mahometans of Afghânistan, and others, have sometimes confederated to make a ferocious exterminating invasion of their territory, and have met in the heart of it, but have been obliged, by the harassing and destructive mode of warfare practised by the Caufirs, to abandon the enterprise. When taken apart from these cherished and bitter antipathies, the Caufirs are a kind-hearted, social, and joyous race.

The country already mentioned lying on the north-east of Caufiristan, and called Kaushkar,[a] must be carefully distinguished from Cashgar near Yarkand. If the names are not originally different, the same name is applied to totally different countries. Kaushkar is high and cold. The inhabitants live chiefly in tents. They are at present Mahometans, and subject to four petty despotisms.

[a] See Elphinstone's Account of Caubul, Appendix, p. 629.

BOOK XLVI.

INDOSTAN.

PART I.

Physical Description.

In our preceding pages, we have oftener than once had occasion to glance at this finest portion of Asia, which we are now about to describe. In riches, population, and importance, India equals more than one great division of the world. Here a nation, a language, and a religion, distinguished for the most venerable antiquity, permanently maintain their ground amidst the fall of many successive empires. India has been known to every period of geography since the age of Herodotus. The writings of this father of history,[a] those of Strabo,[b] of Pliny,[c] and of Ptolemy,[d] exhibit the knowledge which the Greeks and Romans possessed of India, or, to speak more accurately, their acquaintance with its sea-coasts, and with the banks of the Indus and the Ganges. The account of Cosmas, though not meriting on its own account a conspicuous place in the history of geography,[e] serves as an intermediate link to connect the geography of the classic writers with that of the Arabians, whose notions were feeble and detached,[f] like those furnished by the celebrated Marco Polo.[g] In fine, the voyages and enterprises of the Portuguese, which are amply detailed in our history of geography, make a brilliant figure in that department of geographical study. They have brought, as it were, the shores of India into contact with those of Europe, and have opened the way for the more recent voyages, which have furnished the materials for the present description.

Under the classical appellation of India, the ancients, and most of the moderns, have comprised three great regions of southern Asia. The first is that which is watered by the Indus, the Ganges, and their tributaries, called at present Indostan, in the strictest acceptation of this term. On the south of the river Nerbuddah begins that large triangular region sometimes called by Europeans the peninsula on this side of the Ganges, and by the Indians the Deccan, or "country of the south." To this the island of Ceylon, and the Maldives, though separated by an arm of the sea, form natural appendages. The other peninsular projection, which comprehends the Birman empire, the kingdoms of Tonquin, Cochin-China, Cambodia, Laos, Siam, and Malacca, has at present no general name in universal use. Sometimes it is vaguely denominated, "the peninsula beyond the Ganges." Several geographers have called it "external India."[h] We shall afterwards allot a separate portion of our work to that region, under a name which appears to us more appropriate; and in the present book, and the four which follow it, we shall limit our descriptions to the two former divisions, which, both in their physical and political character, have much in common that does not belong to the third mentioned region.

It is to these two countries that the Sanscrit name of *Djamboo-Dwyp*, or the "peninsula[i] of the tree of life," has been applied: also that of *Medhiami* or *Medhiabhumi*, "the middle dwelling," and *Bharatkand*, or the "kingdom of the Bharat dynasty."[k] The country is too extensive to have received one general name in the indigenous languages. But from the river which waters its western boundary having the name of *Sind* or *Hind*, which, like the name *Nyl-Ab*, is derived from its blue colour, the adjoining country received among the Persians the name of Hindoostan,[l] and the inhabitants were called Hindoos.[m] From the Persian language these names passed into the Syrian, Chaldee, and Hebrew;[n] they were imitated in the appellations given by the Greeks and Romans; but in the writings of the Indians, the name Sindhoostan denotes exclusively the countries on the river Sind.

The oriental writers subsequent to the Mahometan era have admitted a distinction between the name *Sindh*, taken in the acceptation now mentioned, and *Hind*, which they apply to the countries situated on the Ganges. This application of terms is equally foreign to the national geography of the Indians, with the appellation of Gentoos, which the English apply to the Hindoos, and which comes from the Portuguese term Gentios, signifying Gentiles or Pagans.

The natural boundaries of India, on the north, are the Himālah mountains, (the *Imaus* and *Emodus* of the ancients,) which separate Bengal, Oude, Delhi, Lahore, and Cashmere, from Thibet. On the Indian side of the loftiest range, a stripe of mountainous but inhabited country intervenes between Thibet and the respective countries now mentioned, but these are considered as belonging to Indostan. On the east the river Brahmapootra seems to be the natural boundary. But beyond

[a] See our History of Geography, Books III. VIII.
[b] Ibid. Book VIII.
[c] Ibid. The whole of Book XI
[d] Ibid. Book XIV.
[e] Ibid. Books XI. and XV.
[f] Ibid. Book XVI.
[g] Ibid. Book XIX. (Oderic de Portenau l. XX.)

[h] "Inde extérieure."
[i] "Ile ou péninsule," island or peninsula.
[k] *Ezoor-Vedam. Mahabharat.* See Wilfort, Asiatic Researches, tom. VIII. and the Edinburgh Review, v. XII. p. 44, &c.
[l] Or Sindhoostan.
[m] Wahl, Ostindien, II. 210—237.
[n] Esther I. 1.

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this river, some Indian hordes have established themselves in the mountains of Anupectumiu, a region scarcely at all known to us. On the south, Indostan is bounded by the ocean. On the west, the river Indus is, in the opinion of some learned men, its proper limit, although the oriental geographers, finding that many Indians live in Beloochistan and Mekran, often include these countries in their Sinde or Sindistan.[a] [b] The former is that which we shall adopt, and which seems to be conformable to the nomenclature of the natives on both sides of the river. When Mr. Elphinstone crossed the Indus at Attock, in returning from Peshawer in Afghânistan, his Afghân companions told him he was now in India, although it is seldom that such a river marks an immediate transition, physical or political. Hence some Indian provinces, under the Afghân sway, have been already touched upon, and in their relation to the rest of India, they will again require to be mentioned while we complete our survey of this country.

We are not yet in possession of exact data for determining the superficial extent of all India. The Indian, Arabian, and Persian authors, differ considerably in their calculations on this point; a circumstance which partly depends on the uncertainty of the lineal road measures, especially the *coss* or mile, which is subject to great variations in the different provinces.[c] The European travellers are also discordant in their estimates. Tiefenthaler rates the whole superficial extent of India at 155,250 square geographical miles; but he supposes the peninsular to be of equal breadth through its whole extent. Pennant is guilty of the same error: but he thinks that India does not extend so far to the north as geographers have believed, and he rates the whole surface of that country at nearly 173,890 square French leagues.[d] Major Rennel contents himself with saying that Indostan Proper is equal to France, Germany, Bohemia, Hungary, Switzerland, Italy, and the Netherlands: and he compares the size of the Deccan to that of the British isles, Spain, and European Turkey, united; consequently the whole would amount to 120,000 square leagues; 66,780 for upper Indostan, and 53,076 for the Deccan. Mr. Hamilton makes it 1,280,000 British square miles.[e] [f]

Those stupendous mountains which lie on the south of Thibet, and on the north of Indostan, have already come into view in our account of Thibet. It is only of late that we have obtained accurate notions of their extent, their altitude, and the territories in their immediate vicinity, and our information still labours under imperfections. They form one of those interesting chains by which the central plateau of Asia is encircled. All the mountains of these regions, and the mass of elevated land included by them, are called in Hindoo mythology by the names Meroo,[g] or Soomeroo, and Kailassam;[h] names so renowned in the east that their fame reached the Greek and Roman authors. These names designate the Indian Olympus, the native dwelling of gods and of men. These mountains and elevated plains, rich in the precious metals, furnished in the time of Herodotus and of Ctesias, that quantity of native gold[i] and of auriferous sand which gave rise to the fables concerning pismires which industriously amassed stores of this precious metal, and fountains from which it bubbled up.[k] These golden mountains of the Indians bear an equivalent name among the Mongols and the Chinese.[l]

That part which forms the northern boundary of India, is a continuation of the same range with that to the west of the Indus, known among the Afghâns under the name of Hindoo Coosh. To the east of that river, it increases in height, and assumes a character of additional grandeur, both from that circumstance and from its great extent in every direction. It forms, in fact, one of the sublimest features in the structure of the old continent and of the globe. Here a long range of summits, covered with perpetual snow, presents itself to the Hindoo, who has in all ages raised towards it an eye of religious veneration. All the names by which it is distinguished are derived from the Sanscrit term *Hem*, signifying snow. Hence have arisen the name *Imaus* and *Emodus*[m] among the ancients, and the Himâlah, Himadri, Himachal, and Himalaya, of the moderns.[n] [o] The river Indus passes through a series of narrow defiles in lat. 35°, which scarcely offer any interruption to the mountain chain. The direction of the mountain is eastward, as far as the north-east point of the valley of Cashmere: from this point, its direction is to the south-east, extending along the sources of all the rivers which run across the Punjab to fall into the Indus, with the exception of the Sutledge, which, like the Indus itself, rises on the north side of the range, and takes its passage across its breadth. Pursuing the same direction, the Himâlah mountains cross the heads of the Jumna, the Ganges, and their numerous tributary rivers. Farther east, they seem to be penetrated by several rivers, as the Gunduk, the Arun, the Teesta, the Cosi, and the Brahmapootra. The geography of the countries to the east of this last river is so little known, that it is a question whether the same mountain range is continued any farther. It seems agreed that, if it is continued, its height ceases to be equally great; it is probable, however, that a continuation of it extends along the northern frontier of the provinces of Quang-si and Quang-tong all the way to the Chinese sea, declining gradually as it advances to the east.

It is only of late that the height of the Himâlah mountains on the north of India has been appreciated. In 1802, Col. Crawford made some measurements,

[a] Ibn Haukal, Oriental Geography, translated by Ouseley, 138—141. 143.

[b] "But some Hindoos are found, even in the eastern provinces of Persia, particularly in Mekrân, a country which the oriental geographers often include in their Sindistan." M. B.—P.

[c] Wahl, I. 9. Tiefenthaler.

[d] Pennant's View of Hindostan, I. 3.

[e] Hamilton's Description of Hindostan, vol. 1. Introd. p. XXXVII.

[f] 1,020,000 geog. sq. miles. *Ed. Encyc.*—P.

[g] Meru.

[h] See a Hindoo map of the world in Maurice's Indian Antiquities, and Paolino, Systema Brahmanicum.

[i] "Or de lavage," gold found in beds of alluvial earth, and obtained by washing.—P.

[k] See our History of Geography, Books III. and VIII.

[l] *Altai-Alin-Topa*, and *Kin-Shan*.

[m] Ἰμαος and Ἡμαων. Arrian. Malte-Brun.—P.

[n] This old Indian root also brings to mind the *Hemus* of Thrace, the *Hymettus* of Attica, the *Mons Imæus* of Italy, and the different mountains called *Himmel* in Saxony, Jutland, and other countries.

[o] It is also written *Hymia, Héma, Himawat*, Hemakote, *Hematche, Imos, Iema*, &c Malte-Brun.—P.

which gave a much greater altitude to these mountains than had been ever before suspected, and Col. Colebroke, from the plains of Rohilcund, made a series of observations, which gave a height of 22,000 feet. Lieut. Webb, in his journey to the source of the Ganges, executed measurements on the peak of Jamunavatari, which gave upwards of 25,000 feet. The same officer, in a subsequent journey, confirmed his former observations. This conclusion was objected to on account of a difference of opinion on the allowance which ought to be made for the deviation of the light from a straight direction, on which all conclusions drawn from the measurement of the angles must depend.[a] In a subsequent journey, however, this same officer confirmed his conclusions by additional measurements, and by observing the fall of the mercury in the barometer, at those heights which he himself visited.[b] It was found by these last observations, that the lower limit of perpetual snow is considerably higher than it ought to have turned out under that latitude, by the application of the principles laid down by Humboldt and Professor Leslie. By the indications of four good barometers, compared with a barometrical journal, kept by Capt. Hardwicke at Dumdum, about fifty feet above the level of the sea, he found the elevation of the Niti Ghaut to be 16,814 feet, yet there was no snow on it, nor on the cliffs 300 feet above it. The line of perpetual snow, therefore, does not begin till at least 17,000 feet above the level of the sea. The banks of the Sutledge, at an elevation of nearly 15,000 feet, afforded pasturage for cattle, and yielded excellent crops of *Ooa* or mountain wheat. This mild temperature, at so great an elevation, is confined to the northern side of the Himālah. At Kedar-Nath and other points on the southern side, perpetual snow commences not much higher than 12,000 feet. This probably depends on the greater height of the whole territory on the north side, in consequence of which, the heat which the earth receives from the solar ray, and which warms the air immediately superincumbent, is not so much expended by the time the ascending air reaches these greater elevations, as in that which has ascended from a much lower country.[c] Mr. Fraser, in a later journey, inferred that the loftiest peaks of the Himālah varied from 18,000 to 22,000, or at most 23,000 feet, about 4000 less than the preceding estimate. But he had no instruments with him for measuring the altitudes, and no barometer, and he probably did not make the due allowance for the extraordinary height of the snow line. He considers that part of the range which lies between Bhagirath and the valley of Nepâl as its most elevated part, the mountains decreasing in height both to the west and to the east. The following are the heights of some of the peaks which have been ascertained:

Dhawalagivri, or the White Mountain, near the sources of the Gunduk river, above the level of the sea,	26,862
Jamootri,	25,500
Dhaiboon, seen from Catmandoo,	24,768
Another Peak seen from the same capital	24,625
Another near to the preceding,	23,262
A third in the same vicinity,	23,052
Peak St. George, estimated at the same place by Capt. Hodgson,	22,240

Thus the Himālah mountains exceed in elevation the Andes of America; that of Chimborazo, the highest of the latter, not exceeding 21,470 feet above the sea. Through this stupendous chain there are different passes, but all of them laborious to travel, and some highly dangerous. One of the most practicable is that which in its upper part follows the bed of the river Sutledge. To the east of this, there are some practicable only at a favourable season, and where the traveller still runs the hazard of being caught in a fall of snow, or otherwise perishing with cold. Through the whole mountainous tract, and even before ascending much above the inhabited parts, the traveller is liable to be attacked with an alarming failure of respiration, from the great rarity of the air, an affection attributed by the natives to various fanciful and sometimes superstitious causes. Some of the most difficult passes are occasionally traversed by marauding parties from the one side of the Himālah to carry off the property of the inhabitants on the other. Such passes exist between Nepâl and Thibet, or that stripe lying close to the north side of the Himālah, which is inhabited by Bhootees, and may probably come under the name of Bootan, a name of which we are not at present able to assign the exact local extent. Here there are also one or more easier passes, chiefly along the beds of the rivers Gunduk, Arun, and Teesta. Hence armies have crossed from Nepâl to attack the territory of Thibet, and a Chinese army has in return invaded and subjugated Nepâl. The difficulty of access to these regions heightens the ardour of the admiring Hindoo, actuated in some degree by curiosity, but much more by superstition, to bathe himself in the icy streams which give origin to the Ganges or its mighty tributaries; to contemplate the mystic rock, which so closely resembles the hind quarters of a bullock, and is reputed to have been the result of a holy transmutation of a divine being, a scene where it is reckoned a merit to make a voluntary sacrifice of life, by precipitating the body over the fatal crag. Superstition has in many instances chosen to cherish its propensities in localities signalized as the origin of large and fertilizing rivers. No where is this carried so far as in this mountainous tract, and it must be confessed, that in no locality is the sublime character of the scenery so much in unison with such feelings. In the Hindoo Pantheon, Himālah is deified, and is described as the father of the Ganges, and of her sister Ooma, the spouse of the destroying power Siva, the favourite object of propitiatory adoration.

Had we extended India to the west of the Indus, we should, in that quarter, have taken the Soliman range as a boundary, participating of the character of the northern boundary in being mountainous, though far from being equally stupendous. These have come under review in our account of Afghânistan. The

[a] Quarterly Review, Vol. XVI.

[b] Ibid. Vol. XVII.

[c] The following observations have been recently made by Capt. Gerard, on the valley of the Sutledge: On the south slope of the mountains, the highest point of cultivation was about 10,000 feet; the highest inhabitants at 9,500. The forest reached to 11,800; bushes to 12,000. On the north slopes, a rich turf was observed at 16,200 feet; the greatest height at which plants grew was 17,000, but mosses and lichens grew still higher. The highest point gained was 19,411 feet. *As. Journal.*—P.

territory lying along the western bank of the Indus, between the river and the mountains, is Indian both in its aspect and population, though Afghân in its political relations, and therefore will be entitled to a glance in the passing, while we treat of Indostan.

Another system of mountains is that of the Ghauts,[a] *i. e.* the "passages, or gates."[b] This is considered as commencing at Cape Comorin: yet the southern chain, or the Malayala mountains,[c] form a separate group, terminating in the district of Coimbetore, at the great valley in which the forts of Palikadery and Anamaly are situated.

The Ghauts begin separately on the north of these plains, forming two branches, one running to the east, and the other to the west of north. The eastern Ghauts pass within about seventy miles of Madras, forming the boundary of the Carnatic, and to the north of that country divide into several branches, in which the mountains are subjected to interruptions, being separated by valleys covered with thick forests.[d] But the principal chain is divided by no hollow grounds, except narrow defiles, which are well lined with fortresses. To the natives, this chain is known by the name of Ellacooda, or the "White Mountains." It then runs along the northern margin of the Circars, forming an uninterrupted series of mountains so close as to afford none but two military passes. At the place where the Ghauts separate the Circars from the province of Berar, the mountains become almost inaccessible, and there is only one passage for carriages and for horses, viz. that of Salarghaut, which leads to Bahar. Nothing is seen on every hand but masses of rock, rising perpendicularly to the clouds, and leaving apparently no outlet for the intimidated traveller. All the summits of this chain are composed of granite,[e] and it every where presents one picture of total barrenness and utter nakedness. Yet large trunks of trees in a state of petrifaction, are found here, and more particularly in the ravines created by the torrents, where trunks, projecting from the steep sides of the rocks, sometimes serve for bridges.[f]

The western chain of the Ghauts extends along the west coast at a distance of from forty to seventy miles, and acquires a greater elevation than the eastern chain. Its height has not yet been ascertained by barometrical observations, but it is generally believed to amount to three or four thousand feet. The chain then crosses Kanara and Sunda, passes near to Goa, enters the Mahratta country, and there divides into several branches. The closeness of the forests, the depth of the precipices, and the rapidity of the torrents, render these mountains very difficult to cross, and the passage is, in many places, fifty or sixty miles long.[g] They are described as containing much limestone, and some basaltic rocks, but no one has deliberately studied the position and materials of the different strata. Towards the sea-coast, the western Ghauts present a magnificent amphitheatre of rocks and verdure, enlivened with towns and villages. The highest, or at least the steepest part to the east of Surat, goes under the name of the Bala-Ghauts, which is sometimes extended to the whole of the western Ghauts, while the eastern chain, together with the intermediate plateau, is called the Paien-Ghauts.

About the sources of the river Godâvery, some lower chains are sent off from the mass of the western Ghauts, pass through the interior of the peninsula, and join the mountains of Berar and Gundwana. The central chains which run parallel to the course of the Nerbuddah river, one on its north side, and the other on the south,[h] generally pass under the Sanscrit name of the Vindhias. The extent which this name embraces appears somewhat arbitrary to our most learned eastern geographers. But Arrowsmith more positively confines it to the mountains immediately adjoining the Nerbuddah. It is also in these central countries that the Hindoos place their Sanyah and their Sookhian mountains, though they have been mistaken for the western Ghauts.

With the exception of the point of Diu on the west, and Cape Comorin in the south, India has no great promontories. The peninsula of Guzerat presents a projection altogether singular, and without which, India would form the oblique quadrangle to which it was compared by the ancients. The bays of Cutch, on the north, and of Cambay on the south of Guzerat, are the only bendings of the coast which merit the name of gulphs. The western coast of the Deccan, though indented by numerous creeks, road-steads, and mouths of rivers, has, on the whole, one uniform direction.

From Cape Comorin to the coast of Bengal, there is not a single natural harbour, and the vessels have no retreat except the roads belonging to the commercial stations; and even in these the merchant vessels are obliged to ride at a distance of a mile and a half from the shore, and ships of war at two miles. At that distance, the depth does not exceed ten or twelve fathoms. So gradual is the declivity of the bottom, that at a distance of twenty miles from land, the depth does not exceed fifty fathoms. The great number of sand banks, renders it necessary to employ, in landing, boats of a particular construction, invented by the natives.

The fertility for which India is distinguished is in a great measure derived from the numerous rivers, streams, and torrents, by which it is watered. The imposing character of these has commanded the admiration both of ancients and moderns. Here all the phenomena which the course of a river can combine, are presented on the most magnificent scale. First falling in foaming turbulence, and frequent cataracts, from immense heights, fed by all the snows of the mountains of central Asia, the Indian rivers already rival, in the volume of their waters, the largest that are to be found on the European continent, even before they have laid aside the impetuous rapidity of our mountain torrents. In the successive junctions of

[a] Gauts or Gates.—M. B.

[b] Very analogous to the Swedish *Gata*, the Danish *Gade*, the Dutch *Gatt*, and the English *Gate*.

[c] Malayala signifies mountains.

[d] Lemon on the roads into the Cumbenand-Cudapah countries; Mackenzie on the roads from Nellore to the western passes; in Dalrymple's Oriental Repertory, p. 53.

[e] Buchanan's Journey to the Mysore.

[f] Sonnerat, I. 23.

[g] Dirom's Narrative of the Campaigns of India.

[h] "These central chains, one of which follows the course of the Nerbuddah on the north."—M. B. The Vindhia or Vendhya mountains pass through Bahar, Allahabad, and Malwah, along the north side of the Nerbuddah, nearly to the western coast. The parallel chain, south of it, is called the Tahya hills. *Ed. Encyc.*—P.

these rivers, the momentum of matter moving from two different directions, produces in its mutual shock a violent intermixture, an encounter like that of two immense armies, which strikes the beholder with feelings at once the most animating, and the most sublime. When farther advanced, and now arrived in the level country, these enormous currents excavate beds for themselves which are several leagues in breadth. Scarcely does the mariner's eye descry, at any one time, the two opposite banks, which are covered with palm trees, temples, and palaces; the transparent waters, like those of the ocean, have a surface smooth as a mirror, except when ruffled by the winds. A force, resistless but imperceptible, hurries along the myriads of barks with which their surface is covered. The tides of the great ocean, entering with freedom the wide expansion of their beds, repel the river waves, and sometimes the retrogade current is rapid and violent. At the place of meeting, navigation becomes apparently hazardous, from the mountainous elevation of the waves, and the powerful whirl generated by the mutually opposing currents.—These great and numerous rivers do not, however, entirely neutralize the parching influence of the tropical temperature. Many districts of India, between the Indus and the Ganges, exhibit a scene of the most frightful sterility. Hundreds of villages forming the same neighbourhood, depend for subsistence on the waters derived from immense tanks, or reservoirs, which have been formed at an enormous expense.

We shall begin our delineations with the river earliest known to the western world, the Indus. The sources of this river have not yet been fully explored. But our information extends higher in its course than it did a few years ago. We have been enabled, at least, to correct the error of mistaking this river, or some of its eastern tributaries, for the source of the Ganges, an error which we find adopted in the construction of maps till a very recent period. The commencement of this river is fixed, by the most probable conjecture, in the northern declivity of the Cailas branch of the Himâlah mountains, about lat. 31° 30′ N. and long. 80° 30′ E. not far from the town of Gortop in the Undes, a territory now under the dominion of China, and within a few miles of the lake Rawanshead and the sources of the river Sutledge. It is supposed to flow for 400 miles in a N.N.W. direction, then assuming a S.W. course, comes to Drâss, a town of Little Thibet; here it is seventy yards broad, and excessively rapid, and it receives another large branch, called the Ladak river, which flows past the town of Ladak. It is only below Drâss that its course is known with certainty, the difficult and desolate nature of the country having checked inquiries in its higher parts. From Drâss, the Indus pursues its solitary course for above 200 miles, through a rude and mountainous country, to Mullai, where it receives the Abasseen, penetrates the highest Hindoo Coosh range, passes for fifty miles through the lower parallel ranges, to Torbaila, where it enters the valley of Chuch, spreading and forming innumerable islands. About forty miles lower down, it receives the Caubul river from the west, and soon after rushes through a narrow opening into the midst of the branches of the Soliman range of mountains. Its stream is extremely turbulent, and sounds like a stormy sea. When its volume is increased by the melting of the snow, a tremendous whirlpool is created, and the noise is heard to a great distance. Here boats are frequently sunk, or dashed to pieces. There are two black rocks in this part of the river, named Jellalia and Kemalia, which are pointed out by the inhabitants as the transformed bodies of the two sons of Peeree Taruk, (the Apostle of Darkness,) founder of the Rooshenia sect, who were thrown into the river by Akhoond, the opponent of their father. At the town of Attock, the river, after having been widely spread over a plain, becomes contracted to 260 yards, but is much more deep and rapid. When its floods are highest it rises to the top of a bastion about thirty-seven feet high. At Neelâb, fifteen miles below Attock, it becomes still narrower. From this it winds among the hills to Calabag, passes through the salt range in a clear, deep, and placid stream, and then pursues a southerly course to the ocean, without any interruption, or confinement from hills. It expands into various channels which separate and meet again. Below Attock it receives the Toe and other brooks from the west. At Kaggawala, the Koorum, a stream of considerable magnitude from the Soliman mountains, falls into it. The only one to the south of this point which it receives, is the Arul, which supplies very little water, being mostly drawn off for irrigation in the north of Damaun. At Kaheree, the Indus, when at its lowest, is 1000 yards in breadth, and rather shallow, being diminished by the separation of some branches from it. At Mittenda it receives the Punjnud, formed by the union of five large tributaries. This immense stream previously flows parallel to the Indus for seventy miles; at Ooch,[a] which is fifty miles up, the distance across, from the Indus to the Punjnud, is not more than ten miles. In July and August, this whole space is completely flooded. The most of the villages contained in it are temporary erections, a few only being situated on spots artificially elevated. The whole country which it traverses is of the same description, all the way to Hyderabad, the capital of Sinde. On the left bank are some considerable towns and villages, with canals for agricultural purposes. Though the Indus gives off lateral streams as it approaches the sea, it does not form a Delta exactly analogous to that of Egypt. Its waters enter the sea in one volume, the lateral streams being absorbed by the sand without reaching the ocean. It gives off an easterly branch called the Fullalee, but this returns its waters to the Indus at a lower point, forming in its circuit the island on which Hyderabad stands. From the sea to Hyderabad, the breadth of the Indus is generally about a mile, varying in depth from two to five fathoms. The tides are not perceptible in this river higher up than sixty or sixty-five miles from the sea. The land near the mouth does not possess the fertility of the Delta of the Nile, or the Ganges. The dry parts exhibit only short underwood, and the remainder arid sand, putrid salt swamps, or shallow lakes. From the sea to Lahore, a distance of 760 geographical miles, the Indus and its tributary the Ravey are navigable for vessels of 200 tons. In the time of Aurengzebe, a considerable trade was carried on by means of

[a] Wuch, "Utsch."—P.

this navigation, but from the political state of the country it has long ceased.

From Attock to Mooltan, this river is called by the natives the Attock, and further down it has the name of Soor, or Shoor, but among the Asiatics, it is generally known by the name of Sinde. Though one of the largest rivers in the world, the Indus has never obtained such a reputation for sanctity as many inferior streams in Indostan, a circumstance which may proceed from the barren and uninteresting character of the country through which it flows.

The five eastern tributaries which by their union form the Punjnud, are celebrated from having been the scene of some events conspicuous in history. The most northerly is the Jylum, or *Hydaspes*, the Bahut of Abul Fazel, which takes its rise in the mountains on the south-east side of the valley of Cashmere, where it is called the Vedusta. Proceeding westward, through that celebrated valley, it passes the capital, where it is joined by a small stream from the Ouller lake. Twelve miles further down, it is joined by the Little Sinde, still runs straight west, through the hills and valleys adjoining Cashmere, increased by numerous rivulets and torrents in its way. Before it turns south, it receives the Kishengunga, coming from the northward, in its course through the hills. This river is extremely rapid, and from 100 to 600 yards broad. It is never fordable, but only fifteen or twenty yards of its breadth are so deep as to require swimming. It flows southward 450 miles till it joins the Chenâb at Tremmoo, 100 miles above Mooltan. The Chenâb or *Acesines*, the second tributary, and the largest of the five, arises in the Himālah mountains, near the south-east corner of Cashmere, in the Alpine district of Kishtewar. Due north from the city of Lahore, this river is 300 yards wide in the dry season, but a mile and three furlongs when swelled by the rains. Like the Jylum, it is not fordable, yet easily crossed in consequence of only a small portion of its width requiring to be swam over. Its junction with the Jylum is accompanied with great noise and violence; a circumstance noticed both by the historians of Alexander and of Timoor. Fifty miles below their junction these united streams receive the Ravey.

The Ravey or *Hydraotes* is the third of the Punjâb rivers. It issues from the mountainous districts of Lahore, but its sources have not been explored. Flowing to the south-west, it enters the plains near Rajepoor, from which the canal of Shahnehr was formerly drawn to Lahore, a distance of eighty miles, though now filled up. It supplied the city with water, by keeping it at a higher level in the dry season, when this, like most of the Indian rivers, is twenty or thirty feet below its banks. Here it is fordable in dry weather, being only four feet deep. It has many banks and quicksands; its sides are low and well wooded. It enters the united streams of the Jylum and Chenâb forty miles above the city of Mooltan. This is the least of the five rivers. Its length probably does not exceed 580 miles.

The fourth is the Beyah, or *Hyphasis*, rising in the mountains of Keloo in the pergunnah of Sultanpoor. It is shallow and fordable in dry weather, but abounds in quicksands. This and the fifth, or Sutledge, meet before either has proceeded more than a fifth part of the diameter of the Punjâb country, and their united stream flows the rest of the distance, to complete the conflux called the Punjnud.

The Sutledge rises in the Undes to the north of the great Himālah range, within the territory claimed by the Chinese; proceeds almost due west; then gradually bends to the south in crossing the subordinate mountains. It is the *Hesudrus* of Pliny, the *Zaradras* of Ptolemy, and the *Saranges* of Arrian. It exhibits stripes of fertility along its banks, in the midst of a cold and dreary though sublime region, forming the western limit of the hilly territories which the British lately wrested from the power of the Ghoorkas. Whether it rises from the celebrated and sacred lake Manasarovara, or not, is a point not satisfactorily ascertained; and the precautionary policy of the Chinese government will probably long prevent us from acquiring a more correct knowledge of geography in that direction. The Sutledge seems to be the largest river within the Himālah range, between the Indus and the Brahmapootra. From its origin to its junction with the Beyah, it runs about 500 miles. The united Beyah and Sutledge are called the Kehra or Gavra, which flows for more than 300 miles before it forms the Punjnud, which contains the waters of the whole five, and carries them to the Indus.

The union of all the five rivers into one before they reach the Indus, was a point in geography maintained by Ptolemy; but, owing to the obscurity of modern accounts, promoted by the splittings of the Indus, and the frequent approximation of streams running in parallel courses, we had been taught to correct this as a specimen of that author's deficiency of information, till very recent and more minute inquiries have re-established that questioned point, and along with it the merited credit of the ancient geographer.

The Ganges is called by the Hindoos, *Padde*, and *Boora-Gonga*,[a] or "the river," by way of eminence. This mighty river was long supposed to have its origin on the northern side of the Himālah mountains, till the fact came to be doubted by Mr. Colebrooke; in consequence of which Lieut. Webb being sent in 1808 by the Bengal government to explore its sources, ascertained that all the different streams above Hurdwar, which form the Ganges, rise on the south side of the snowy mountains. At some places above its confluence with the Jumna, the Ganges is fordable; but its navigation is never interrupted. At a distance of 500 miles from the sea, the channel is thirty feet deep when the river is at its lowest. This depth it retains all the way to the sea, where, however, the settling of sand by the neutralization of the current, from the meeting of the tide with the stream of the river, produces bars and shallows which prevent the entrance of large vessels. The accessions which the Ganges receives in spring by the melting of the mountain snow are not considerable. At any great distance from the sources, as at Patna, any cause affecting these sources produces little comparative effect. About 200 miles from the sea, the Delta of the Ganges commences by the dividing of the river. Two branches, the Cossimbazar, and the Jellinghy, are given off to the west. These unite to form the Hoogly,

[a] Or *Ganga*.—M. B.

or Bhagirathy, on which the port of Calcutta is situated. It is the only branch commonly navigated by ships, and in some years it is not navigable for two or three months. The only secondary branch which is at all times navigable for boats, is the Chandah river. That part of the Delta which borders on the sea is composed of a labyrinth of creeks and rivers called the Sunderbundst with numerous islands, covered with the profuse and rank vegetation called jungle, affording haunts to numerous tigers. These branches occupy an extent of 200 miles along the shore. The Ganges, though so little affected by the melting of the snows, owes part of its increase to the rains which fall in the mountains. Hence it rises fifteen feet by the end of June, when the rainy season in the low country is scarcely begun. The remainder of its rise, which is in all thirty-two feet, is occasioned by the rain which falls in Bengal. By the end of July all the lower parts of the country adjoining the Ganges, as well as the Brahmapootra, are overflowed for a width of 100 miles, nothing appearing but villages, trees, and the sites of some villages which have been deserted. A stripe along each bank of the river remains for some time uncovered, that part being highest in consequence of the more abundant deposition of mud at the river's edge, where the quantity held in suspension is the largest and contains the heaviest particles. Between August and November it decreases from four inches to two per day, and after that till April continues decreasing at a daily rate of half an inch. The difference of elevation of the waters always diminishes as the river approaches to the sea. At Luckipoor it is only six feet, at Dacca fourteen, and at Custee thirty-one. This last place is 240 miles from the sea, and the surface of the river in the dry season is eighty feet above that of the ocean. The Ganges is calculated to discharge in the dry season 80,000 cubic feet of water in a second; and, as its water has double the volume when at its height, and moves with a greater velocity in the proportion of five to three, it must at that time discharge 405,000 cubic feet. The average for the whole year is reckoned 180,000. The deposition of slime is sometimes extremely rapid, so as to fill up deep beds, or form extensive islands. In other parts the river extends its width in particular lateral directions, forming steep banks of soft soil, which, from their liability to tumble in, are dangerous of approach by land or by water.

That line of the Ganges which lies between Gangootree,[a] or the source of the leading stream, and Sagor island, below Calcutta, is held particularly sacred. The main body, which goes east to join the Brahmapootra, is not regarded with equal veneration. Certain parts of the line now mentioned are esteemed more sacred than the rest, and are the resort of numerous pilgrims from great distances to perform their ablutions, and take up the water to be employed in their ceremonies. Wherever the river happens to run from south to north, contrary to its general direction, it is considered as peculiarly holy. The places most superstitiously revered are the junctions of rivers, called *Prayags*, the principal of which is that of the Jumna with the Ganges at Allahabad. The others are situated among the mountains. Hurdwar, where the river escapes from the mountains, and Sagor island, at the mouth of the Hoogly, are also sacred. The water of the Ganges is esteemed for its medicinal virtues, and on that account drunk by Mahometans, as well as Hindoos. In the British courts of justice, the water of the Ganges is used for swearing Hindoos, as the Koran is for Mahometans, and the gospels for Christians.

The waters of the Ganges are augmented by many successive tributaries, some of which are very large rivers. On its right bank it receives the Jumna, which has a previous course of 780 miles from the lower range of the Himālah between the Sutledge and the Ganges, and falls into the latter at the fortress of Allahabad. It is said to receive at the same point a rivulet under ground, on which account the junction is called, according to Tiefenthaler, Trebeni, or the confluence of three rivers.[b] Lower down it receives the Soane, which arises in the table land of Amerkoontook,[c] in the mountains of Gundwana, and falls into the Ganges a little above Patna. On its left it receives the Ramgonga, from the mountains of Kumaoon;[d] and the Goomty, which, arising in the same hills, crosses the province of Oude, from north-west to south-east, passing Lucknow, and falls into the Ganges below Benares. The Gogra, after forming the eastern boundary of the British district of Kumaoon, which it separates from the Goorkha territory, passes near Fizabad, and joins the Ganges in Bahar, where it is called Dewa, being one of the longest tributaries which the Ganges receives. The Gunduk is supposed to rise near the great Himālah peak called Dhawala Giri, or the "White mountain." Some conjecture it to come from the plateau of Thibet. In its higher parts it is called Salgrami, from the number of ammonites contained in the schistous rocks over which it passes, which are objects of worship among the Hindoos under the name of Salgrams, being considered as visible traces of the divine Vishnu. It joins the Ganges opposite to Patna. The Cosi arises in the Nepâl hills near Catmandoo, receives the Arun, (which is supposed to rise from the north side of the great mountain ridge, and penetrate between its snowy peaks,) and joins the Ganges in Bengal, after a course of 300 miles. The Teesta has not been explored by Europeans, but is said by the Nepâlese to arise in Thibet, and cross the great mountains. It formed till lately the eastern boundary of the Nepâl territory, separating it from the dominions of the Deb Raja of Bootan. It joins the Pudda, or great body of the Ganges, after a course of 400 miles.

The Brahmapootra is the largest river of India, though among the least sacred. Its sources, though never yet explored, seem to be situated near lake Manasarovara in Thibet, near those of the Indus and the Sutledge. It flows eastward through Thibet, where it is known under the name of Sanpoo, or "the river." It passes near to Lassa, the residence of the great Lama,

[a] Gangootree (Gangoutri) is not the source of the Ganges, but the point where it issues from Himalaya. The river is there 15 or 20 yards broad, and waist deep. *(Lt. Webb.)*—P.

[b] "According to Tiefenthaler, the place of their junction is called Trebeni, or the confluence of three rivers, because a rivulet, called Sursoti, joins it there." M. B.—P.

[c] Amercuntuc.

[d] "Kemaoun."

also to the north of Teshoo Lomboo, the seat of the Teshoo Lama, occupying a widely expanded bed, and forming numerous islands. Its principal channel near this place is narrow, deep, and never fordable. It receives various rivers from the south, and probably also from the north. After a long easterly course, in which it is conjectured to approach within 220 miles of Yunnan, a province of China, it makes a vast circuit round the mountains, where it is lost to European knowledge. Making a sudden curve to the south, it re-appears in Assam, into which country it is supposed to descend by a series of cataracts, and up to which it is said to be navigable. On reaching Assam, it turns nearly due west, receiving a copious augmentation from numerous mountain tributaries. During this direction of its course, it separates into two; the southern branch being distinguished from the northern or main body by the name Kolong. These meet again after inclosing an island five days' journey in length and one in breadth. About Goalpara, the British frontier town, the expanse is magnificent and the scenery grand, but the water is dirty and offensive. During floods it carries before it logs of wood and vast floats of reeds, together with dead bodies of men, deer, and oxen. In its rise and fall, it follows periods nearly coinciding with those of the Ganges. Its navigation is rendered difficult by shifting sand-banks and trunks of trees sticking in its bed. Its banks and islands within the British territories undergo continual changes. After entering Bengal, the Brahmapootra makes a circuit round the western point of the Garrow mountains, then runs southward through the Dacca province, is joined by the Megna, which, though a comparatively small river, now gives its name to the united stream, which is regularly four or five miles wide. The course of the Brahmapootra has a length of 1650 miles, but passes through a rude climate and a barren soil, differing in this respect widely from the Ganges. Rising from opposite sides of the same mountains, these rivers separate to a distance of 1200 miles, but are destined to meet again at Luckipoor in Bengal, where they form a wide gulph[a] communicating with the ocean.[b]

The Nerbuddah is one of the largest rivers which have their rise in the interior of India. It descends from the plateau of Amerkoontook, close to the source of the Soane, and runs in a solitary course, scarcely receiving any other river, its waters being augmented by very small streams. It flows directly west to the Gulph of Cambay, where it falls into the ocean near to the city of Broach. In the dry season it may be crossed on foot.

The Tuptee[c] also runs from east to west, rising in Gundwana, near the village of Batool, and flows into the sea at a distance of a few leagues from Surat. The mouths of both these rivers are greatly obstructed with sand banks.

The peninsula of the Deccan is, like the more northerly parts of India, well watered with rivers, the greater part of which descend from the western Ghauts, run from west to east, and fall into the Bay of Bengal. Beginning in its northern part, we have first the Mahanady, or Kuttak, rising in the mountains of Bundelkund, and crossing the province of Berar with many sinuosities, where it receives numerous rivers; near to the city of Kuttak it divides into several branches, one of which falls into the lake Chilka, while the others continue their course to the Bay of Bengal, forming a delta of islands covered with jungle and wild thickets.

The Godavery, descending from the western Ghauts, waters the Nizam territory and Berar, is joined by the Wurda, the Silair, and the Bhaigonga,[d] and divides into two branches at Rajamundry, which afterwards form more numerous streams, and fall by so many mouths into the bay. This river is held very sacred by the superstitious Hindoos. It is sometimes named the Ganges, and its source, like that of the great Ganges, "The Cow's Mouth."

The Krishna,[e] farther to the south, has a similar origin with the preceding, crossing, like it, almost the whole peninsula; it receives the waters of the Beema, the Gutpurba, the Malpurba, and the Tomboodra,[f] crosses the Soobah of the Deccan, and falls into the Bay of Bengal, to the south-west of Masulipatam. This river is another object of worship; its name signifies black, that being supposed to be the colour of Vishnu during his ninth incarnation. Like the Ganges, it has its periodical floods.

Among various streams of less note in the south of the Deccan is the Cavery, which comes from the mountains of Coorg, crosses the Mysore, which it fertilizes, and the Carnatic below, which owes its chief productions to the water which it distributes. It is the most useful river in the south of India. Opposite to Trichinopoly it separates into two branches, and forms the island of Seringham. The southern branch runs at the highest level, and is very much drawn off by canals for agricultural purposes. The northern, which is called the Coleroon, runs in a low bed. It approaches the other about thirteen miles below their place of separation, and mounds are formed to prevent the waters of the Cavery, or southern branch, from falling down into it. The coming of the fresh water from the interior is celebrated by the natives with joyous festivity. The river is adored as one of their most beneficent deities,[g] and the anniversary of the marriage of the goddess of the river with the god Renganaden, is held annually by the worshippers of Vishnu.

Only two seasons are known in India, the dry and the rainy, produced by the south-west and north-east monsoons. In the dry season, vegetation universally labours under a deadly languor, more especially if the rains are unusually late in setting in; but a rain of one night's duration transforms into a verdant meadow, a plain which on the preceding day was a spectacle of utter aridity, where not one leaf of herbage could be found. In the interior and western parts of India, the

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[a] Dr. F. Buchanan, Turner, Rennel, &c.

[b] The Brahmapootra, in Assam, has two principal branches: the Lohit, which comes from the E. and rises S. of the mountains, and the Dibong, which comes from the N. and is supposed to be the same with the Sri-Lohit, or Sampo, of Thibet. But it is not yet ascertained whether it does not rise S. of the mountains. It is really the main river, and is three times the size of the Lohit.—P.

[c] "Tapti."

[d] "Baingonga;" Bainjunga, Ed. Encyc.

[e] "Kistna." [f] Toombuddra. [g] Wilks, Heyne, &c.

rainy season commences in April or May, and continues to the end of October. On the Coromandel coast it begins later, as the clouds which are brought by the south-west winds are detained by the Ghauts.

While this season lasts, it is a rare thing to see the rays of the sun penetrating the dense vapours with which the atmosphere is loaded. In Bengal it rains incessantly for many days. Twenty, or twenty-two inches depth of water are computed to fall in a month. The rivers overflow their banks, and cover the whole country, except places which are on elevated situations, or protected by dykes.

On the Malabar coast, the sudden heavy showers, storms, and hurricanes, are more violent than on that of Coromandel. If the rain does not come on at the ordinary time, or if it is not in sufficient quantity, dismal effects follow for the whole year, often amounting to the most destructive famine. In 1793, so great was the scarcity occasioned by the drought, that parents sold their children for a few pounds of rice. The conclusion of the rainy season is marked by changes of wind and storms of the most violent description. Bernier has remarked that the rain does not come from the same quarter of the heavens in all parts of India; that about Delhi it almost always comes from the east; in Bengal, and on the Coromandel coast, from the south; and on the coast of Malabar from the west.[a]

The climate of India is that of a country chiefly situated within the torrid zone, and at the same time, adjoining a boundless mass of icy mountains. In the greater part of this extensive country snow and ice are unknown; but every other disadvantage of weather is incident to it in a temporary manner.[b] Nowhere do hurricanes rage with greater fury. Nowhere are the lightnings and peals of thunder more appalling. Nowhere is the husbandman more liable to the ravages of protracted drought or drenching floods of rain. It might be interesting to determine the general laws on which the local variations of the seasons in different parts of India depend. Why do the rains last for eight months in the Circars, and only two in the Carnatic, as has been asserted, these countries both lying on the Coromandel coast? But Europeans have sometimes exaggerated the prominent features of the climate, by giving way to first impressions. Bengal has received a bad character for insalubrity, and certainly it is in an eminent degree exposed to a succession of violent extremes and vicissitudes; at one time to excessive rain, at another to hurricanes; then to scorching heat, and frequently to thick fogs; yet the English have, by dint of prudent regimen, accommodated themselves to the climate.[c] The shores of Coromandel experience more violent heat and drought than those of Malabar; yet the narrow valleys and thick forests of this latter country comprehend many unhealthy situations. The plateaus situated between the two chains of the Ghauts, the countries lying between the Jumna and the Ganges, the territories forming the Punjâb, or lying in its neighbourhood, derive from their moderate elevation above the sea, from their wooded hills, and their numerous streams, a temperature less oppressive, and a purer and healthier air,[d] except where forests, marshes, or arid deserts, give rise to local disadvantages. The great desert situated on the south-east of the Indus, and to the north of Guzerat, exhibits all the horrors of the deserts of Arabia, while the valleys of Cashmere and Serinagur, Gorkhah, and Nepâl, encircled with alpine heights, experience, in succession, the rigours of a real winter, the delights of a lengthened spring, and a healthy summer.

It was in the Punjâb, and the other elevated countries to the north, that the ancients collected numerous examples of Indian longevity.[e] The *Cyrni*, and the subjects of Prince *Musicanus*, often lived to the age of 130, or 200 years. The moderns have gone still farther. The Portuguese historian Faria states, that an inhabitant of Diu attained the age of three full centuries; and he adds that, according to the accounts of the natives, several individuals of 200 were to be found in Guzerat. Extreme simplicity of diet and perfect tranquillity of mind may procure for some of the Fakirs a lengthened period of existence; but, taken at an average, this is a climate in which the force of vitality receives a quick development, and is subjected to speedy exhaustion. Acute diseases carry off numerous victims by sudden death. One of the most formidable is the bilious colic, known on the coast of Coromandel by the name of *mordekshim*, transformed by Sonnerat and other French writers, with more humour than truth, into *mort de chien*, "the death of a dog." The hill fever, which prevails in the higher part of the Circars in the districts of Grandjam[f] and Vizagapatam, is ascribed to the stagnant air of the forests, and the narrow shaded valleys. Other fevers, no less pernicious, operate as a scourge to the inhabitants of the Carnatic, and are known by the name of the *gendchi* fevers.[g] Leprosies assume a dreadful character in the warm and moist districts; the most terrible form of the Arabian leprosy, that in which the limbs drop off joint by joint, extends its ravages among the more indigent classes.[h] It differs from the elephantiasis of modern physicians, which seems to be a kind of dropsy accompanied with cutaneous eruption.[i] This last disease, which prevails on the coast of Cochin, where the water is of bad quality, derives its name from the enormous enlargement of the patient's limbs, which resemble those of an elephant.[k] But among the ancients the term was applied to a leprosy distinguished by white wrinkled blotches on the skin. The Europeans, who generally escape these dismal visitations, are not exempt from the slow influence of a hot temperature, and a continual excessive perspiration. They contract a sallow complexion, and are early subjected to the infirmities of old age. A

[a] Bernier, Voyage, edit. Amsterd. 1709, tom. II. p. 319. Rennel's Memoir.

[b] "Momentanément avec une violence extrême;" occasionally with extreme violence.—P.

[c] Gladwyn's Narrative of the Transactions in Bengal, p. 27, &c.

[d] Forster's Journey from Bengal to Petersburgh. Buchanan's Travels in the Mysore.

[e] Strab. XV. 701. Almelov. Faria y Sousa, Asia Portugueza.

[f] Ganjam.

[g] Anquetil, Voyage.

[h] The Djosaam of the Arabs; also the *Daa-el-assad*, or lion's disease; the λεοντιασις of the Greeks.

[i] "Mais quelquefois avec la lèpre;" but sometimes with the leprosy.—M. B. There are two diseases to which the term elephantiasis has been applied: the tubercular or black leprosy, which is the proper elephantiasis; and the Bucnemia or Barbadoes leg, the one alluded to in the text.—P.

[k] Ives, Voyage, I. See M. Allard's work on a disease resembling elephantiasis.

slow inflammation, or disorganization of the liver, is the most common complaint among them.[a] But, with all these partial disadvantages, India contains in its cultivated parts the most healthy climates to be found in Asia.

The fertility of the soil, and the nature of the productions, are as various as the temperature and climate. India is traversed by large chains of rocky mountains, and by hills of sand. Both of these are found in the province of Sinde. A series of rocky mountains reaches from the confines of Mooltan to Tatta, and a series of sandy hills from Ootch to Guzerat. There are also sandy deserts where the burning south wind carries before it clouds of dust, in which it buries houses and cultivated fields. The desert of Descht-by-Daulet, which separates Sinde from Candahar, is one of the largest in India. It is properly in the territory of the Afghâns. There is another, twenty miles long, between Rooderpoor in Delhi and Almora, covered with thorny reeds and resinous shrubs.[b] The northern provinces contain numerous savannahs. At the mouths of the great rivers the soil is usually marshy. In some instances the marshy land extends along a great part of the banks of the rivers in the interior.[c] But, with the exception of these uncultivated parts, India presents on all hands beautiful meadows, rich pastures, fields loaded with abundant harvests, which are gathered twice in the year, and valleys filled with every useful and every beautiful product of vegetation.

Rice, the chief food of the frugal Indian, abounds in most of the provinces. The varieties of that plant are reckoned twenty-seven[d] in number. Rice in the husk it called *nellu*, and when shelled *arissi*. Tanjore, on the coast of Coromandel, supplies the whole island of Ceylon. Arrack, the spirit obtained from rice, is mentioned by the ancients. India also produces those species of grain which are most common in Europe—as wheat, barley, maize, and millet. Several species of *Holcus* are cultivated, as the *holcus sorghum* of Linnæus, (the *Andropogon sorghum* of Dr. Roxburgh,) commonly called *tchor* and *dourra*, and the *Holcus spicatus*, or *badchera*, a common food of the people, particularly among the Mahrattas. Our leguminous species are also cultivated, such as peas, beans, and lentils, together with many which do not grow in Europe, such as *moong*, (the *Phaseolus mungo*,) *murhus*, (the *Cynosurus coracanus*,)[e] the grain of which is small like mustard seed, and is used for cakes; *tanna*, a very productive grain, requiring little or no trouble in its cultivation; *tour*, (the *Cytisus cajan*,) which is sown at the beginning of the rainy season; and, lastly, *toll*, a shrub the produce of which is a sort of pea, and, next to rice, the most favourite food of seamen. Melons and pine apples are quite common; also the *lotus*, or sea lily:[f] the roots of this plant are used in different ways. Its red flowers and round leaves, sprinkled with drops of water glittering like diamonds, adorn the surfaces of the pools. Instead of our potato, the Indian has the *katchil*, a root black on the surface, and white in the interior; the *igname*,[g] which often weighs several pounds, and the *Arachis hypogœa* or *moogphully*.[h]

Here the kingdom of Flora is arrayed in all her glory. Cashmere salutes the sense with the perfume of its roses, from which the highly valued ottar is obtained. The fine white rose, called *koondja*, scents the vales of Delhi and Serinagur:[i] the *kadtumaligu*, or large flowering jessamin; the *Banisteria bengalensis*, or atimuca, which is equally elegant; and the tchambaga, which the Indians use for adorning their hair, and perfuming their clothes, are all remarkable for their fragrance. We must also particularize the *Mussœnda*, which displays so fine a contrast of white leaves and blood-red flowers; the *Ixora*, which, from boughs six feet in height, exhibits its scarlet and yellow[k] tufts of flowers, like so many bright flames, enlivening the foliage of the woods; the *sindrimal*, whose flowers open at four in the evening, and close at four in the morning; the *nyctanthes sambac*, with which the Indian women perfume their hair before going to bed; the nagatalli or *Pergularia tomentosa*, which creeps along the walls, covering them over with its foliage,—a plant poisonous to the serpent tribe.

India produces many of those plants which are subservient to industry and commerce; as flax, hemp, tobacco, indigo, jalap, sarsaparilla, datura, cotton, anise, betel, saffron, sesamum, opium, many dyes, besides various reeds and canes. The hilly countries of Oude, and those at the foot of the Ghauts, produce large crops of cardamom; the best comes from the coast of Malabar, where also all kinds of pepper grow abundantly, so that the Arabians call it *Belad-el-folfol*, or the "pepper country." It is also produced in the island of Ceylon, in Bengal, and in Bahar. The *Papaver orientale*, from which the indolent natives obtain opium, thrives in almost all the provinces; the opium in most esteem is from Bengal and Bahar. The Indian sesamum furnishes an oil known to antiquity as an article of commerce. The cotton tree grows on all the mountains of India, but its produce is coarse in quality; the herbaceous cotton prospers chiefly in Bengal, and on the Coromandel coast, and there the best cotton goods are manufactured. Next to these two provinces, Madura, Marawar, Pescaria, and the coast of Malabar, produce the finest cotton. The ancients seem to have got their muslins from the banks of the Indus, since they called them *Sindones*. India is the native country of the betel or tambal, a plant which, like the ivy and the hop, twines round trees and poles; its leaves are chewed along with areca nuts, spices, and tobacco.

A great part of the soil of India is covered with forests of bamboo. This species of reeds, which sometimes attains a height of sixty feet, is an article of great use to the Hindoos in the erection of their slight habitations. The indurated juice of this plant, called tabasheer, has been used in medicine, and in the eyes of the scientific,

[a] Pennant's View of Indostan.
[b] Tiefenthaler, I. p. 102.
[c] "Along the river Padder, the marshes occupy a considerable extent of country." This is the sentence in the original. It alludes to the great marsh, called the *Runn*, between Cutch and Guzerat.—P.
[d] "Twenty-five."
[e] This is not a leguminous plant, but one of the Cerealia or grasses.—P.
[f] Nelumbo or water-lily.—P.
[g] Yam.—P.
[h] Pea-nut or ground-nut.—P.
[i] Hardwick, in the Asiatic Register, 1800. Miscellan. Tracts, p. 270.
[k] "Its purple tufts."

is a curious object as a vegetable secretion, being what chemists call a hydrate of silica, *i. e.* flint in union with consolidated water.[a] Various other reeds, as the *Arundo calamus*, abound every where. The sugar cane, common through the whole of India, is cultivated in Bengal, particularly at Rajamundry and Ganjam,[b c] and a million of quintals of sugar are annually exported thence to Europe. Indigo grows spontaneously in the province of Guzerat, and this plant is cultivated on a large scale in Bengal, Bahar, Oude, and Agra.[d] A tree belonging to the genus *Nerium* has been recently discovered in the Circars, which yields a valuable blue dye.[e]

India contains all the different species of palms, from which are obtained fruits, liquors, a sort of paper, oils, meal, cordage, and other useful articles. The cocoa tree is undoubtedly the most valuable of this tribe. The *jaggari*, or black sugar, obtained from the juice of the cocoa-tree, is used at Tranquebar,[f] at Madras,[g] and in Pegu,[h] to form, along with white of eggs, lime, and shells, a cement which resists moisture and the solar heat, and is susceptible of a fine polish by friction. This cement has been successfully employed in Holland. The *Areca* nuts, the fruit of the cabbage palm, and bananas, are also to be added to the vegetable riches of India. The small fruited banana, or *Musa sapientum*, has in all ages been the food of the philosophers and the priests of Brahma. The Indian fig, or banyan tree, stretches its immense branches and its holy shade, not only over the pagodas, and the *choultries*, or caravanseras, but also over serpents and other venomous creatures,—an emblem of the eternal power of nature, which cherishes both useful and hurtful beings. It is a variety of the Budha tree, which is revered in the various countries between Indostan and China. Hence it is called by Linnæus the *Ficus religiosa*.

Our fruit trees, such as the apple, the pear, the plum, the apricot, peach, walnut, almond, orange, pomegranate, and mulberry, thrive in the north of India, while the southern parts abound in bread-fruit, guavas, jambos, and mangos; but the mangosteen of the Sunda islands thrives only by cultivation,[i] even in Coromandel.

Our tall forest trees, such as oaks, pines, cypresses, and poplars, as well as myrtles and tamarinds, are found in every part of the country. But the forests chiefly consist of species unknown to our climates, such as the teak, a hard and almost incorruptible timber, fitted to supply the place of the oak in ship-building, the *ponna*, (the *Uvaria altissima* of Kœnig, and the *Valeria indica* of the *Hortus Malabaricus*,) an ever-green which produces excellent masts; the *koru* or *sacoo*, a tree vaguely mentioned by Tiefenthaler as forming whole forests in the northern parts, and which, with the djissoo (a species of *Pterocarpus*) furnishes small building timber; the *Nagassa*, or iron wood, various *Robinias*, the azedarach, and many other species less known. The Indian ebony, extolled by Virgil, is found in the island of Ceylon, and according to some on the banks of the Ganges, at Allahabad;[k] yet it is probable that the ancients received their ebony from the eastern coast of Africa, then included under the name of India.[l] The agreeable odour which that wood is said to have diffused inclines us to doubt if it was obtained from the tree which we now call ebony. The red sandal tree, and the trees which produce dragon's blood, gum lac, and gamboge, grow in the Deccan and in Ceylon; also the *Guilandina moringa*, which produces a red gum. Among the species of laurel which abound in the southern part of the peninsula, and in Ceylon, we find those which produce mace,[m] cassia, and camphor, and above all, the cinnamon tree, vainly claimed by Arabia as a native, on the testimony of the Greeks,[n] and now transplanted from Ceylon to the northern Circars.[o] Other trees of more diffusible fragrance perfume the forests, while they adorn them with their splendid blossoms. Such are the *Bignonias*, the *Guettardas*, and the *Pandanus odoratissima*.

Among the numberless treasures of a Flora imperfectly known, are some productions which were in high celebrity among the ancients, though now not found or not recognised with certainty. The number of dissertations written for identifying the true amomum is almost ridiculous.[p] We must not blame the indefatigable patience of the modern learned, but the vagueness and obscurity of ancient science. The Indian *Nard*, or spikenard,[q] is probably the species of valerian known by the Hindoos under the name of *Jatamansi*,[r] although there is a gramineous species figured and described as the true nard.[s] *Malabathrum*, another aromatic, which was purchased by the Romans at a very high price, was probably a compound extract of a number of plants with odoriferous leaves, such as the laurel called in Malabar *Tamala*, and the *nymphea* called *Tamara* in Sanscrit; the termination *bathrum* being from *patra*, the Indian word for a leaf. Perhaps further researches may discover more of the productions which were so highly prized by the ancients. The *Bdellium* of Pliny, probably a myrrh or odoriferous resin, was known to the author of the book of Genesis, under the name of *Bdolach*,[t] and the *Sipachora*, the fruit of which conferred a longevity of 200 years, as Ctesias and Elian gravely assure us, might be known from a species of worm which burrows in it, and which furnishes a purple dye. Gum-lac is doubtless a production of the *Mimosa cinerea*.

Though the mineralogy of India has not been thoroughly explored, it is certain that in mineral wealth it is one of the richest countries in the world. The ancients say that gold was heaped up by the ants in

[a] See Dr. Brewster's optical experiments on this substance in the Philosophical Transactions.
[b] Roxburgh, Asiat. Register, 1800. Miscell. Tr. p. 7—15.
[c] These towns are situated in the Circars.—P.
[d] The *Indigofera anil*, a shrub which yields a blue colour like indigo, is also found in those provinces. M. B.—P.
[e] See the Alfred newspaper, 24th May, 1811.
[f] Accounts of the Danish Missionaries, II. p. 1050. III. p. 22—241.
[g] Pike in Phil. Trans. No. 422, Art. 3.
[h] Vincent Leblanc, Voyages, I. p. 201 and 226.
[i] "Ne vient que par la culture." [k] Ayen Akberi, II. p. 36.
[l] Voss, Commentary on Virgil's Georg. p. 306 (in Germ.) Compare Virg. Georg. II. 116. IV. 290. Æneid, IV. 794.
[m] The mace is the outer covering of the nutmeg, of the genus *Myristica*. It is not a laurel.—P.
[n] Beckman ad Antigoni Caristii Histor. Mirab. p. 87. Id. Litteratur der Reisen, I. 562.
[o] Pennant's View, I. 222.
[p] Breinius de Amomo Arabum, in the Miscell. Curios. medico-physic. 1681, obs. 191. Salmas. Exercit. Plin. p. 283, &c.
[q] The best kind of it grew in the neighbourhood of Rangamaty, in the N. E. of Bengal.—M. B.
[r] Sir W. Jones on the Spica Nardi in the Asiat. Researches.
[s] Philos. Transactions, 1790, vol. LXXX. p. 284.
[t] Plin. XII. 19, should be read Bdellium sive Bdolchon.

India. Whatever meaning we attach to such traditions, we find that the ancients are strictly correct when they speak of the auriferous rivers of this country.[a] The rivers of the Deccan, of Orissa, and of Berar, still carry down gold in considerable quantities. In the Punjâb and in Cashmere, the Ayen Akberi mentions several rivers with golden sand, a proof of the abundance of that metal in the great Imaüs. Mr. Fraser, in his Highland Tour, mentions the Sutledge and other streams in its neighbourhood as at this day affording grains of gold, which are obtained by washing. Rich mines, both of gold and of silver, also occur in Golconda, the Carnatic, Assam, and Bengal. There are copper mines in the mountains of Kumaoon and in the provinces of Badrikshân,[b] Agra, and Adjemere. Iron is found in almost every province of India. The kingdom of Assam is celebrated for its iron and steel[c] mines. There are whole mountains of magnetic rock in the neighbourhood of Hoa in the province of Agra, from which a quantity of iron is extracted. The same countries which contain silver mines furnish also large quantities of lead, such as the kingdom of Assam, and the mountains of Kumaoon. Some mines of tin are worked near Zamva, in the province of Adjemere, and in the Punjâb; zinc is quite common in India, and a quantity is exported to Europe. Quicksilver and antimony are found in a few places.

In no part of the world are diamonds so numerous or so beautiful as in India, especially in the provinces of Bengal, Bundelkund, Allahabad, Orissa, Berar, Visapoor,[d] Golconda, and the Carnatic. Those of Golconda and Orissa, and especially those of Sumbulpoor on the banks of the Mahanady, the river *Adamas* of the ancients, are considered as much superior to those of Parna[e] in Allahabad. Here also are found rock crystals, rubies, sapphires, amethysts, onyxes, and other precious stones. After heavy rains the rivers detach them from the recesses of the mountains, and drag them along in their course. The Mahanady, or Cuttac, is one of the most remarkable for the precious stones which are found in its channel. One in the kingdom of Ghoorkha[f] is mentioned as furnishing a great many.[g] Lapis-lazuli, which, in its perfect form, is one of the most beautiful productions of nature, and which is with great probability considered as the sapphire of the ancients,[h] is chiefly found in the mountains on the north-west of India, the Hindoo Coosh and Beloot Tag. The Indian onyx, which was probably the *shoham* of the Jewish high priests, came from a chain of mountains mentioned by Ctesias, and which seems to correspond to the Bala Ghaut hills.[i] Almost every mountain in India contains quarries of marble and alabaster. Those of Adjemere contain white, black, and green marbles. Bahar is rich in alabaster. Rock salt is found in several mountains. In Adjemere, and on the coast of Coromandel, there are large salt lakes. Guzerat has plains covered with salt. In every quarter this useful article is carefully worked. Several provinces, especially Bahar and Bengal, furnish saltpetre, and a considerable quantity is exported to Europe, Tartary, and China. Sulphur, coal, naphtha, and other inflammable minerals, are found in several districts, both of Upper Indostan and the Deccan. Impregnations of sulphur, nitre, and other mineral substances, are said to be contained in some rivers, such as the Gunduk.[k]

The animal kingdom is equally rich in species as the two preceding.

Among the Mammalia are monkeys, which make their appearance every where in troops. On the coast of Malabar, thousands of them come to the very centre of the towns: they are of many species. Gibbons are found chiefly in Bengal, and on the coast of Coromandel; the beautiful long-tailed maudis in the Deccan. There are tillows, vallakurangas, or little white monkeys, and koringurangas, or large black apes. Ourang outangs are found in Bengal, in the Carnatic, and on the coast of Coromandel. The radjakada ape, with a red face and black beard, is, in the eyes of the superstitious Hindoos, a representative of their god Hanooman, the Indian *Pan*, who, having assumed that form, placed himself at the head of an army of monkeys, for the assistance of the god Rama, and materially contributed to the discomfiture of Ravan, king of the giants, and master of Ceylon.[l] It seems a certain fact that, in former times, monkeys, in consequence of the respect paid to them from superstitious impressions, peopled India in myriads. Alexander's army met with a body of them so enormously numerous that they took them for a hostile nation, and prepared to give them battle. In those places where the power is in the hands of the Brahmins, the Hindoos allow these animals the enjoyment of perfect liberty: hence they devastate the fields, plunder the orchards, and commit ravages in the heart of the towns. Those philosophers who maintain that animals are endowed with improveable intellects, though kept down by the human species, should tell us why the apes of Malabar, respected and caressed, have never contrived to found a political community.

The southern provinces are infested with bats of all shapes and sizes. The most remarkable is the vampire, or flying cat, which often devastates the fruit trees of Guzerat, and the coast of Coromandel. Squirrels are equally destructive, especially the *maleannan*, which lives in flocks on the highest trees on the Malabar coast;[m] the large Indian squirrel,[n] which attaches itself particularly to the cocoa tree; and the yellow squirrel, which lives in a gregarious state in Guzerat.[o] The Malabar coast produces many porcupines, one of which,

[a] Tiefenthaler, I. 222—274. [b] "Badrikesram."
[c] There is properly no such thing as steel mines. The sparry ore, (carbonate of Iron,) from the readiness with which it is converted into steel, is sometimes called *steel ore*.—P.
[d] Bejapoor. [e] Pannah.
[f] In the district of Dirdjen-Shal.—M. B.
[g] Gladwyn's Hist. of Indostan, I. p. 34.
[h] Baier, Dissert. de Sapphiro. Beckmann, History of Inventions, III. 182, &c. (in German.)
[i] Veltheim, Mémoire sur les Montagnes à onyx de Ctésias. Heeren, Idées sur la Politique, le Commerce, &c. 136—816. 2d edit.

[k] "Gaudek."
[l] Ramayana, an Indian poem, partly translated by Messrs. Carey and Marshman.
[m] Sonnerat, Voyage aux Indes, tab. II. 87. Pennant, Indian Zoology, tab. 1. View of Indostan, I. 137—202.
[n] Sciurus maximus.
[o] The language of the original is different. Instead of the great Indian squirrel, it says, "the *annan*, or little squirrel;" and after the account of the yellow squirrel, it adds, "the *pouprède*, which is often met with in the neighbourhood of Bombay."—P.

the pangolin,[a] is often kept tame in houses. In Bengal, and along the eastern coast, is found the two-toed sloth;[b] and in Bahar there is a variety of this species which has a considerable resemblance to the bear, is called by naturalists *Bradypus ursiformis*,[c] [d] and lives on ants.

India has several species of rats and mice, as the striped mouse, the musk rat, and the jerboa or jumping rat. These animals, numerous and bold, bid defiance to the cats. It is by dogs and professional rat-catchers that their breed is from time to time kept down. There are hares, rabbits, and martins, particularly in the northern provinces; civets or *meroovas* of two varieties, badgers, coatis,[e] and *mungos* or ichneumons, which are capable of being tamed, and vigorously hunt the rats, the bats, and even the large serpents.

The mountain bear, more terrible than the tiger, and which inhabits the Ghauts, according to a tolerably well informed traveller, Paulin de S. Bartholomé,[f] is perhaps a large hyæna: but the true bear makes its appearance in the forests of Oude, Orissa, the Carnatic, and Coromandel. Wolves are seen, particularly in the Ghauts, the Carnatic, Malabar, and Guntoor. The jackals are formidable in the interior of Indostan. The hyænas are very numerous in the kingdom of Orissa, and on the coasts of Malabar and Coromandel. Bengal produces a fox of a particular species, small in size, and possessed of great agility.[g]

Mr. Pennant, in his Indian Zoology, has taken much pains to distinguish the different species of ferocious animals of the cat kind, which inhabit this country. Ceylon and Bengal have two varieties of the tiger-cat. The serwal, or panther-cat of the Deccan, which is little known, extends as far as Thibet. The lynx lives in the northern provinces; the caracal, a black-cared variety of the lynx,[h] makes his appearance in Bengal. This is also the true country of the royal tiger, known to the ancients by the name of the Ganges tiger.[i] This formidable animal reigns in company with the rhinoceros over the marshy uninhabited extremity of the Delta of the Ganges, called the Sunderbunds. Here he even attacks the boats as they pass through his domain. Ceylon, and the Ghaut mountains, contain only the common tiger, the size of which is less majestic. The Asiatic panther of Pennant seems to be a variety of the tiger, with spots instead of stripes. The blackish variety, with black spots, is peculiar to Indostan.[k] The leopards, which have dark blotches on a white ground, vary considerably in size and colour. The ounce, which is the panther of Pliny, and is employed in hunting the antelope, is found in all the central parts of the Deccan, and in Guzerat. The *guéparde* of Buffon,[l] the great *pardalis* of Oppian, is less common; it is called *tchita*.[m] After all the trouble which Mr. Pennant has bestowed on this subject, it is not yet entirely divested of obscurity.

At present, the lion, at least the African species, distinguished from the lion of Babylonia by his long mane, is unknown in India. But Terry says, he saw them in Malwah. From the old Indian writings, we are led to believe that the lion, called *singh*, was formerly spread over the whole of India.

The Indians make little use of horses: the kinds peculiar to their country are the *tattoo* in Bengal, a very small horse, but an excellent runner;[n] the *goot* or *gunt* in the north of Indostan, and the *tchangley*, which comes from the province of Batty. The best horses to be seen in India are of foreign importation, chiefly from Arabia and Tartary. Asses and mules are not in general use. In the north, and even in the Deccan, wild ones are found which have descended from the high lands of Thibet. The Hindoos, like the Europeans, attach an idea of extreme meanness to the use of asses for riding. The koolan and the djigghetai of Tartary travel down to pass the winter in the forests of India. Among the Indian dogs, those used in the chace were famous in antiquity: they hunted the wild boar, and even the lion and the tiger,[o] and many of them were exported to Persia and Babylon. The best come from the north, and particularly from Caubul.[p] Camels and dromedaries, the only proper beasts of burden in eastern countries, are found in great numbers in Guzerat, in the neighbourhood of Patna and of Monghir, in Mooltan, and in Tatta. In this last province, the author of the Ayen Akberi saw herds consisting of some thousands. The camel, with two humps, lives in a state of natural liberty in the northern provinces.

The Indian sheep is distinguished from the European race by his reverted horns, and the silkiness of his wool. This breed is found all over India, excepting towards the extremity of the peninsula. Ctesias was acquainted with the riches of northern India in the article of wool. When he assures us that the sheep of these countries were as large as the Grecian asses, and that they were employed as beasts of burden, he speaks of the common Cashmerian sheep, which the inhabitants call *hundoo*.[q] The fine-wooled Cashmerian sheep[r] furnishes the delicate material used in the manufacture of shawls.[s] In Mooltan the *bhara*, or broad-tailed sheep, is also found, and the Thibet sheep, so highly prized for the quality of its wool. This precious article consists of the interior or shorter hair. In the kingdom of Assam, the rams have four horns. Finally, India contains also the Argali, or wild sheep, the *capra ammon* of Pennant.[t]

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[a] The pangolin is not a *porcupine*, but an animal of a peculiar genus, covered with imbricated scales. (Manis. Linn.)—P.

[b] The two-toed sloth is a native only of tropical America. *Cuvier.*—P.

[c] Pennant's View, II. 258—260. Hist. of Quadrupeds, No. 452.

[d] B. ursinus. *Shaw.*—P.

[e] The coatis are found only in America. *Cuvier.*—P.

[f] Paulinus (or Paolino) de Sancto Bartholomæo, a Catholic missionary. Voyage I. p. 403.

[g] Pennant's Hist of Quadrupeds, No. 170.

[h] The caracal is a distinct species.—P.

"Tigre du Gange." Tigris Gangetica.—P.

[k] Pennant's View, II. 153.

[l] The hunting tiger, (*Felis Jubata.*)—P.

[m] Pennant's Hist. Quad. No. 184. Synopsis, p 174. tab. 18. fig. 1. View of Indostan, II. 246. Asiat. Reg. 1809. Misc. Tracts, p. 338—342.

[n] Solvyns, les Hindous, t. III.

[o] Ælian, Hist. An. IV. c. 19. VIII. c. 1. compare with Heeren, Idées, I. p. 818.

[p] Ayen Akberi, I. 303.

[q] In the German, Danish, Swedish, and English languages, *hund* (or hound) signifies a dog. The female of the stag, (biche, Fr.) is called *hind* in Danish and English; *hindin* in German.

[r] "La brebis fine du Kachemire."

[s] The finest shawls are made of the wool of the camel, not of the Thibet goat, as has been asserted. The second quality of shawls are made of the wool of the Cashmerian sheep. Ed. Encyc.—P.

[t] Pennant's Hist. of Quadrupeds, p. 44. H.

Guzerat and Cutch contain many goats, both wild and tame: the Cashmere goat furnishes very fine wool for shawls. In the mountains and forests of Orissa, Telinga, Berar, and Malabar, the goat is met with from which bezoar is obtained, a morbid concretion formed in the intestines, presenting the appearance of a mineral, and valued in Asia for certain supposed medicinal qualities. Hogs and wild boars, stags and deer, make their appearance in great numbers. Flocks of antelopes are seen in Bengal, and the rest of India. Besides the species common to Persia and Tartary, we find the *nylgau*, or blue antelope with white feet, called also *ros*,[a] and a small white species called *dirdhagen* by Mr. Gladwyn, the male of which has four horns, and reminds us of the four-horned *oryx* of the ancients.[b] The elk is frequently seen in the island of Ceylon; but it may be questioned whether it is the elk of Europe, or merely a species nearly allied to it.[c]

The ox and cow are treated with as much religious veneration in India as they were in ancient Egypt. Considered as symbols of the productive energies of nature; emblems of the sun and moon; these living monuments of history and civilization are believed to attend the great god Siva, and the goddesses Parvati and Lakshmi, the one the Cybele and the other the Ceres of the Hindoos. The touch of a cow purifies the individual from all his sins. Only forty or fifty years ago, a king of Travancore, that he might make atonement for his cruelties, caused a colossal golden cow to be made, passed through the body of this image with the profoundest humility, and after this dated his edicts from the epoch of "his passage through the cow." This sacred race, which is very handsome in Guzerat, Malwah, and Bengal, is distinguished from the European breed only by a fatty protuberance on the back. It is the zebu or *Bos Indicus* of naturalists. In Ceylon and in the neighbourhood of Surat, there are oxen no larger than mastiffs.[d] The buffalo is spread over the whole of southern India. The *yak* is found in the most northern provinces. The animal which the Indians call the arni has more resemblance to the buffalo than to the urus; it is said to be six feet in height, with horns of enormous length, and inhabits the Ghaut mountains and the Himāleh.

The great forests and the marshy districts are peopled with elephants. In the forests of the Ghauts there are droves of two or three hundred. Those which are caught in the province of Tiperah and on the banks of the Brahmapootra are highly valued; but the most docile and handsome, though smaller in size, come from the island of Ceylon. These gigantic animals, once formidable in the field of battle, are now only employed to drag cannon and carry ammunition, to set heavy engines in motion, or to carry on their broad backs the purple tent where a nabob reposes on his gilded cushions, a being sometimes of inferior intelligence to the noble animal which bears him. Elephants are caught in large enclosures formed of strong poles, into which they are driven by the sound of drums and the glare of torches, from which their fears make them retire; the animal is then allured into an interior enclosure by means of a tamed female placed there. He is secured by closing the gates. Connected with this enclosed space is a long alley by which the animal is flattered with the prospect of making his escape, and here he is finally caught by means of beams laid across. He is now led forth bound, under the care of tamed elephants, who soon teach him to obey his masters.[e]—The rhinoceros lives in Bengal, particularly in the islands at the mouths of the Ganges, where he is frequently seen in company with the tiger. The rhinoceros finds in the herbage and underwood of the marshes the coarse aliment on which he lives, while the tiger seeks amidst mud and water a protection from the scorching heat: these savage animals are thus brought together by a union of physical necessities, though they have no instincts for mutual association.

India swarms with serpents. They are found in the forests, in the fields, in the gardens, and even in the interior of the houses. Numerous are the species distinguished by Malabaric and Portuguese names. The most dreaded are the *cobra manilla*, a little blue serpent, one foot long; the *rubdira mandali*, a large serpent, the bite of which causes blood to proceed from the pores of the skin; and the *cobra de capello*, the *Coluber naja* of Linnæus, which is capable of being tamed, though its bite is extremely dangerous. Paulin de S. Bartholomé[f] seriously pretends that he saw serpents with two heads; they were amphisbænas, which have the head and the tail equal in size and of similar appearance, and which the Portuguese call *cobra de duas cabeças*. The royal serpent, or *boa*, one of which, forty feet in length, was killed by M. Anquetil, is treated with divine honours. One of them, which resided in a grotto at Sumbulpoor, was within these few years consulted as an oracle.[g] Even the sea which washes the Indian shores is filled with hideous serpents, the bite of which is dangerous. There is a particular tribe of Indians that make the conjuring of serpents their trade, and teach these animals tricks of a most astonishing nature.[h]

Almost all the rivers, and even the lakes and marshes of Indostan, including the Deccan, give birth to crocodiles larger than those of Egypt, but in other respects scarcely differing from them.[i] There is a smaller variety, which is particularly venerated as a consecrated animal.[k] They are sometimes maintained in the ditches of fortified places as contributing to their defence. Lizards are extremely common in all the provinces. Among the Ghaut mountains there are some of prodi-

[a] Hunter, Phil. Trans. 1771. Asiat. Reg. 1800. Miscell. Tr. p. 285. Pennant's Hist. of Quadr. No. 32.

[b] Ælian, Hist. Anim. XV. c. 14.

[c] The elk is not mentioned, in most accounts, among the animals of Ceylon; indeed it is an animal peculiar to the colder climates. The *Cervus Muntjac* is said to be common, in flocks, in Ceylon.—P.

[d] Pennant, Hist. Quadrup. I. tab. 3.

[e] See the plate in Valentyn, oud en nieuw Oostindien, VIII. Beschryving van Ceylon, p. 47. Asiat. Researches, III. 229.

[f] Voyage, p. 180, (in Ital.) Compare Obsonville, Essais Philos. p. 13, 14.

[g] Motte, in Asiat. Miscell. II. No. 1.

[h] Nouv. rapports des mission. de Halle, cah. 43, p. 648—656.

[i] The Gangetic crocodile, (Lacerta Gangetica,) differs from the crocodile of Egypt so far, that Cuvier ranks it in a separate sub-genus, (the Gavials.)—P.

[k] Pennant's View, II. 207.

gious size. The island of Bombay and some other places swarm with frogs and toads. Turtles are common on the sea-coasts and in the rivers. The best tortoise shell is from the Orissa shore.

Such is the abundance of fish on the coasts of Coromandel, Malabar, and other countries, that domestic animals, as hogs, dogs, and even horses, are fed on them. There are few European species that are not found in India: the most common are the salmon, the pilchard, the eel, the carp, and the tunny. The *mango*, (the *Polynemus paradiseus* of Linnæus,) a beautiful sea-fish of an orange colour, ascends the Ganges. Shining multitudes of gold-coloured fishes adorn the surface of the waters. Here also is found that singular species, the flying fish, which, though capable of taking a temporary flight through the air, as well as of gliding through the water, is so persecuted by enemies in both elements, that his double faculty proves insufficient to secure him from their pursuit. The electrical torpedo and gymnotus[a] sometimes give a shock to the unwary swimmer.

In this warm climate the insects display a brilliance unknown in temperate zones: but they are often highly destructive. Here, as in some of the other countries which have fallen under our view, locusts sometimes settle in whole clouds on the devoted fields. Here many bees, almost all of them in a wild state, prepare a rich aromatic honey. The ants, black and white, form one of the severest scourges of the country. Spiders, large and small, scorpions, cray fish,[b] butterflies of all colours, and silk worms, are to be numbered among the insects. But here, as in other countries, the insects exceed in the numbers of species the plants themselves, though we reckon the list of Flora somewhat formidable to those who attempt to recount or to remember the whole. The shells, the corals, and the polypi, present lists equally overwhelming, and far surpassing any such enumeration as could be admitted into the present work.

We may, however, remark, that the common silk worm, the *phalæna mori*, is not the only insect which provides the inhabitants of India, as it did those of the ancient Serica, with a valuable thread. Two other species, the *phalæna atlas*, and the *phalæna ricini*,[c] give different kinds of silk, which were undoubtedly comprehended under the *bombyx* of the ancients. The fishery of cowries and of pearls will be described in another place.

As for birds, it is in the north of India that the finest eagles, vultures, and falcons, are found. They descend in pursuit of their prey from the same mountains from which India has been often visited by her ruthless conquerors. The griffin vultures and the bearded vultures are common in Siberia. The Mogul princes kept multitudes of birds of prey for the purposes of falconry.[d] In the Deccan there are more than fifty kinds of parrots. That bird, sacred in the eyes of the Brahmins, was in ancient times in great request among the Greeks and Romans, who borrowed from the Persians the names which they gave to it.[e] The rooks and ravens are, among the Hindoos, symbols of the human soul in a state of separation from the body, and are plenteously fed by the hand of superstitious charity. The *Ardea gigas* is believed to be inhabited by the souls of Brahmins. On the coast of Malabar, owls form flocks consisting of some thousands.

India is the country of the peacock. The forests in every part of it are inhabited by enormous flocks of them in a wild state. But the Turkey,[f] according to the most received opinion, is originally from America. Yet this animal is called in German, the "cock of Calicut," and the question of its origin appears deserving of fresh examination.[g] In this country are found almost all the birds of our climates. Among those which are peculiar to it, are the *mango*, which lives on the fruit of the same name; the little bird of paradise, which is common in the Ghaut mountains and in Malabar; the white ibis, whose feathers are used in India in ornamental dress; the black-headed ibis, or bittern;[h] and the blue bird, called *porphyrio* by the ancients, and in the Malabaric language *pidaramkoli*. In all the forests bottle-shaped nests are seen suspended from the boughs by a slender thread, and vacillating in the wind. These are the abodes, as well as the ingenious workmanship, of the *Loxia philippina*.

Were we to give a complete view of the physical features of India, we should far exceed the limits prescribed to the present work. We must therefore pass on from this copious subject to other details which the geographical reader is led more particularly to expect.

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[a] The torpedo and the gymnotus are not found in India; but the Trichiurus indicus, and the Tetraodon electricus, both electrical, are found in the Indian ocean.—P.

[b] The cray fish are now separated from the insects, and placed in a distinct class, the *Crustacea*.—P.

[c] Shaw's Naturalist's Miscellany, plate II. Sir W. Jones, Letter to Mr. Anderson.

[d] Ayen Akberi, I. 306.

[e] It is called *βιττακος* by Ctesias, from Bidak in Persian; and Psittacus is probably from Tedak or Tidak in the same language.

[f] "Coq d'Inde," whence *Dindon*, the more usual name in French.—P.

[g] Beckmann, Litteratur der Reisen, I. p. 26—447—587.

[h] "Butor."

BOOK XLVII.

INDIA CONTINUED.

Topographical View of the countries on the Indus and the Ganges.

After the account which we have given of the general geography of India, we must now take a view of its different provinces in succession. We shall first turn our attention to those which are watered by the Sinde and its tributaries, next to Guzerat, and Adjemere, or the Rajepoot states; then proceed to the basin of the Ganges, and take a view of the regions watered by that river and its tributaries. This will occupy the present book. In the one following we shall take a view of the Deccan, or peninsula, and afterwards of the island of Ceylon and the Maldives.

In our account of Afghânistan, the empire of the king of Caubul, we included the territory on the west of the Indus, and at the mouth of that river, and also the valley of Cashmere, these being Indian provinces of that empire.

We shall now begin with the province of Lahore, consisting of two parts, the one of which is the mountainous tract in the north-east, stretching south and east from Cashmere; and the other the flat country known by the name of the Punjâb, a name sometimes applied to the whole province, and derived from the five celebrated rivers by which it is intersected, and which were described in the preceding book. Hence the climate of this province varies, the hills and northern parts having winters not unlike those of the middle of Europe. The mountainous tract, which includes the origin of four of the five rivers, (the other rising in Cashmere,) is rugged and thinly peopled. It contains several principalities, the chiefs of which are Rajahs of Hindoo descent, who, as well as their subjects, have adopted the Mahometan religion, but retain their Hindoo title. In manners and language the inhabitants resemble the Cashmerians, with a mixture of the more southern nations. Many pines grow on the face of the mountains, the resinous parts of which are cut into slips, and used as lamps, but the extraction of tar and turpentine is not practised. The climate of the northern parts seems unfavourable to fruits, being too hot for the Persian productions, and too cold for those of India. The mountains contain large beds of fossil salt. Their sides, where they are cultivated, produce wheat and other grains. They are cut into a succession of flat terraces, supported by buttresses of loose stones. A small quantity of rice is produced in the narrow valleys.

The flat part of the province, more properly called the Punjâb, is by far the most productive, but, except in the immediate vicinity of the rivers, it is much less fertile than Bengal, or even the British provinces in the higher parts of Indostan; the soil being of a sandy texture. Of the four divisions of the Punjâb, east of the Hydaspes, or Jylum, the two nearest to this river are quite flat, and chiefly pastured by herds of oxen and buffaloes, the cultivation is scanty, and the trees few; that which lies to the east, towards the Sutledge, has an undulated surface, and though naturally the most sterile, is the best cultivated. It contains many fine villages, and some large towns: but the latter, with the exception of Amritsir, the holy city of the Seiks, are in a declining condition.

The Seik nation, which rules the greater part of this country, holds a conspicuous place among the inhabitants of India. The term Seik[a] signifies a disciple. Their founder, Nanak, was born in an obscure station in a village to the north of Lahore, A. D. 1419. Devoted to a religious life, he became eminent as a teacher, inculcated a mild philosophic system, and endeavoured to connect the contending factions of Mahomedans and Hindoos, by fixing their attention on the great principle on which they were agreed, the unity and perfection of God, and making them view their external observances as comparatively insignificant. The worship of Brahma, Vishnu, and Mahadeva, the three chief divinities of the Hindoos, and the use of images, were rejected. When he died, others succeeded. One successor, Arjoonmal, distinguished himself by compiling the Adi-granth, or sacred book of the Seiks, and thus gave a consistent form and order to their religion, but he was treacherously put to death by the Mahometans. This event turned the thoughts of the Seiks to warlike objects. Hurgovind, his son, was a military priest, who urged the Seiks to vengeance, and headed them in a series of desperate attacks on the Mahometan chiefs in the Punjâb, which, however, were suppressed by the vigour of the Mogul government. The execution of Teg Bahadâr, a priest who lived in obscurity at Patna, by the Mogul government in 1675, gave a final turn to the destiny of the Seiks. Gooroo Govind, the son, eminent both as a preacher, an author, and a warrior, new modelled the whole government of the Seiks, and converted them into a band of ferocious soldiers. Steel became the watchword of the state, and even the object of their worship. The supreme deity was denominated by them, "All steel." This bold innovator extinguished all the distinctions of caste among his followers, urged them to unite in the career of military glory, and having collected them amid the mountains of Serinagur, rushed furiously down on the western provinces. He had, however, too potent an enemy in the celebrated Aurengzebe, was defeated, and his adherents dispersed, and he is said to have died insane in the Deccan.

After this they never again acknowledged any spiritual head. But, on the death of Aurengzebe, in 1707, they enrolled themselves under Banda, a military leader, committed dreadful ravages, and treated the places of

[a] "Sicque," Sikh.

worship and burial grounds of the Mahometans with every species of indignity. But they were again defeated and destroyed in great numbers, and Banda was put to death at Delhi with every species of insult and torture, which he endured with unshaken fortitude. After the expedition of Nadir Shah, they issued from their fastnesses, harassed his retreating rear, and plundered the baggage of his army; they now assumed an attitude of independence and defiance, and, after many contests with the Afghâns and Mahrattas, they have obtained possession of the Punjâb. Amritser is their spiritual capital, to which they resort in pilgrimage, and to reach which, while in possession of their enemies, they sometimes braved the danger of death. This is also the seat of their council, where the chiefs on some occasions meet to take oaths of union and mutual fidelity, on their sacred books the Granths. Notwithstanding this practice, they are generally in a state of dissension, and therefore unable to make head against a formidable enemy; so that they owe their possession of their present territory chiefly to the weakness and distraction which prevail among their neighbours, and the balancing management of British policy.

The proselytes belonging to the Seiks are mostly from the Hindoos, who, on joining them, are permitted to retain all their former observances, in so far as they imply no positive infringement of the tenets of Nanak, and are very strict on the subject of diet and intermarriages. The Mahometan converts, on the contrary, are prohibited from following any of the observances of their original creed, are not allowed to practise circumcision, and are obliged to eat pork. The Seiks abstain from several of the sensual indulgences to which the Mahometans are addicted. They do not allow themselves the use of tobacco, but indulge in opium and spirituous liquors to great excess. They are a well made people, and have the countenance of Hindoos, though distinguished from them by their long beards. They have all the activity of the Mahrattas, to which they unite a greater degree of bodily strength, derived from their more favourable climate. They are very courageous, and when animated by religious fanaticism, quite desperate. Their mode of address is bold and somewhat rough; their habitual tone of voice loud and bawling. Their language is chiefly Hindostanee, with a slight intermixture of Persian. Their conduct towards women resembles that of the Hindoos and Mahometans, but is somewhat more relaxed. They prohibit the self immolation of widows on the death of their husbands; though some of their women so far break the law as to take an opportunity for committing suicide when they become widows. Their chief military force consists of cavalry. They use matchlocks and sabres, entertaining for the latter weapon a veneration almost religious. One soldier often keeps a plurality of horses.[a] On these they set a high value, and entertain for them sentiments of affection. When one of their companions dies, they rather express joy than grief; but cry bitterly on the loss of a horse. Their force, at the end of the last century, was said to amount to 248,000,[b] but this must have been an enormous exaggeration. They used to boast that they could raise 100,000 horses; but it is not practicable to bring every horseman belonging to them into the field. Runjeet Singh is the only Seik chief who can bring forward 4000 effective men; and even this prince's force did not, in 1805, amount to 8000. He has subjugated almost all the country north of the Sutledge, while those to the south are under British protection.

The Lahore province includes a territory of 70,000 square miles, but the population probably does not exceed four millions. There is now scarcely any regular trade between this country and the rest of Indostan; but petty merchants can generally obtain passports through the Seik territories, and a trifling commerce is in that manner carried on. The exports to Afghânistan and Persia are sugar, rice, indigo, wheat, and white cotton cloths; the imports are swords, horses, fruit, lead, and spices. From Cashmere they import shawls, cloths, fruits, and saffron. Commerce is much obstructed by heavy duties, though of late greater encouragement than formerly is given to it.

The chiefs generally claim one half of the land produce; but they treat the cultivators with great indulgence, and this revenue is seldom levied to the full extent.

The chief city in this province is Lahore, the capital of Runjeet Singh. It is situated on the south side of the river Ravey, on the great road bordered with plane trees which leads from Delhi to Afghânistan. It has lost much of its ancient splendour, but still contains fine buildings and elegant gardens, though its liableness to warlike reverses has deterred wealthy individuals from residing in it. It contains the beautiful fortified palace of the ancient Mogul sovereigns, one of the finest and most sumptuous in the world. It was founded by Akber, and greatly enlarged by his successors. When beheld from the opposite side of the river, with its varied terraced gardens, it looks like a scene of enchantment, suited to the ideas formed of the palace of Semiramis, or of one of the fairies of the Arabian tales. The terraced roofs are adorned from one end to the other with a thousand species of the finest flowers native to a country which is the abode of eternal spring. The interior of this magnificent building is ornamented with gold, lapis-lazuli, porphyry, and beautiful red granite. The hall where the throne is placed, and the gallery, are most of all admired,—the walls and ceiling being covered with fine rock crystal, and a trellice of massive gold running along, adorned with figures of grapes executed in pearls and precious stones, vying with one another in brilliance. The bathing room contains a bath in the form of a boat, which is made of oriental agate, adorned with plates of gold; this used to be filled with eight hogsheads[c] of rose water. Across the river, and two miles north from Lahore, at Shah Durra, stands the celebrated mausoleum of Jehangheer, within a wall of nearly 600 yards square. Runjeet Singh, the chief, who resides at Lahore, well skilled both in war and intrigue, has, between the years 1805 and 1812, subjugated almost all the Rajahs of the Punjâb, and now rules the country with considerable mildness, main-

[a] "Each soldier has usually two or three horses." M. B.
[b] Franklin, History of Shah Alum, p. 75.

[c] "Muids," a measure of about 60 gallons.—P.

taining a good understanding with the British authorities, of whose intentions he has been taught by experience to entertain no apprehension; very different from the Ghoorkas of the more easterly parts, who, by their oppressions, rendered themselves odious to the tribes which they subdued, and brought down on themselves the repressing hand of British power.

Several parts of this country, adjoining the Afghân territory, are more or less subject to the Afghân power, such as Puckely in the north-west corner, the *Peukelaotis* of the ancients, containing some of the descendants of the troops left in it by Timur as a garrison. North of this is Turnaul, inhabited by the Swaties; and Muzzifferabad, a town belonging to the Mahometan tribes of Bumbas and Cukkas, whose country forms the line of communication between Caubul and Cashmere. The valley and district of Chuch, at the north-west corner of Lahore, is inhabited by Mahometan Hindoos, named Goochers.[a] Near this is the Afghân fortress of Attok, which derives its name from a prohibition under which the Hindoos lie, against crossing the river under the penalty of degradation. It was here that Alexander, Tamerlane, and Nadir Shah, entered India with their armies. Hussein Abdaul is a beautiful valley on the eastern border of Chuch. It has its name from that of a devout saint whose tomb it contains. Rawil Pindee is a large and populous Seik town, sixty-eight miles east, consisting of handsome terraced houses. Here a kind of native newspapers, detailing the transactions of the neighbouring princes, and called the north-western Akbars, are usually dated, but they are careless and idle miscellanies, of no authority whatever.

Between the Indus and the Jylum, the whole country was once in possession of the Goocher tribe, who occasioned much trouble both to the Moguls and the Afghâns, but have been expelled by the Seiks, though they still retain a high military reputation. Their country abounds in grapes. At Manicyala, one of their villages, there is a solid building resembling a cupola, seventy feet high and 150 paces in circumference, situated on the top of a high mound. The natives maintain that it was built by the gods. In architecture it approaches to the Grecian style, and has nothing of the Hindoo character. Leia is the name of a town and district near the southern part of the Sinde Sagor, or the Doab,[b] bounded by the Indus and Jylum, belonging to the Afghâns. This Doab, in general, is divided between that power and the Seiks: the former possesses the district nearest to the rest of their territory. The Doab bounded by the Jylum and the Chenâb, belongs to the Seiks, and is not much known. The next, called Doabeh Rechtna, bounded on the east by the Ravey, is fertile and extensive, and its population greater than that of the preceding, containing some towns of note, as Bissolee, a fortified town, belonging to Runjeet Singh, Vizierabad, and Eminabad. The Doabey Barry (from *Bari*, a residence,) comprehending the low countries between the Ravey and the Beyah, forms the centre of the Seik power, as it contains the cities of Lahore and Amritsir.

Amritsir, formerly called Ramdaspoor, derives its present name (signifying "the pool of immortality") from a basin of 135 paces square, built of burned brick, in the centre of which is a temple dedicated to Gooroo Govind Singh. (Singh signifies a lion, an appellation which the Seiks, and especially their chiefs, adopted when they assumed the character of determined warriors.) It was a very ancient city, under the name of Chak, and was greatly enlarged by Gooroo Ramdas, who built the famous reservoir of Amritsir. Ahmed Shah twice destroyed the temple, and threw dead cows into the water to pollute it. Here Runjeet Singh has a mint where coins are struck in the name of the great saint and founder of the Seik sect, Nanak. The town is unwalled, the streets narrow, the houses well built, but divided into narrow apartments. It is the chief emporium of the shawls and saffron of Cashmere, and the various commodities which come from the south and east of India. A few coarse cloths and inferior silks are manufactured in the place. Being the resort of many rich merchants, and the residence of bankers, it is a place of considerable opulence.[c] The Doabeh Jallinder, the tract included between the Sutledge and Beyah, and bounded also by the mountainous district of Cahlore, is of small dimensions, but of great political consequence, being the only road by which the territory of Delhi can be entered by an army from the west. It is circumscribed by the mountains on one hand, and the desert on the other. It is under the dominion of Runjeet Singh, who holds the Doabeh Singhs in subjection. It is the most fertile portion of the Seik territory, and scarcely inferior to any province of India. Jallinder is its chief town, formerly a residence of the Afghâns, and still inhabited by their descendants, subject to the Seiks. It contains also Noorpoor, a town situated on the top of a hill, which is ascended by stone steps.

The Kohistan (or hill country) of Lahore contains some small independent states, as Kishtewar, the name of which signifies woody, and which is intersected by the Chenâb. Jambo is sometimes tributary to the Seiks, but has a Rajah of its own. The town of that name was once a place of great and well regulated commerce. Khangra is a fortress which Akber besieged for a whole year, commanding in person, before he succeeded in reducing it. The Khangra country is productive in rice, corn, and maize. Here the progress of the Ghoorkas of Nepâl, after the taking of Serinagur, was arrested to the westward. It was defended by its own Rajah, who, however, afterwards submitted to the power of Runjeet. The city of Khangra, called also Nagorkot,[d] is ancient, and contains a magnificent temple, to which, in the months of September and October, a great number of pilgrims from every part of India resort. Cooloo is a country bordering on the Sutledge, the Rajah of which assisted in the war of the British against the Ghoorkas, but he was obliged in the settlement to cede some places to the east of the Sutledge, which he had wrested from that power.

Mooltan is the lowest part or angle of the Doab formed by the Sutledge, the Ravey, and the Chenâb.

[a] Gookers.

[b] *Doab* is a term applied in India to any tract of land situated between two rivers above their point of junction.

[c] Sir John Malcolm, Asiat. Regist. vol. X.

[d] "Nagrakot."

This is the country of the ancient *Malli*. At present it is not much known to Europeans. The city of Mooltan, four miles from the left bank of the Chenâb or *Acesines*, which has previously received the Ravey or *Hydraotes*, and the Jylum or *Hydaspes*, is inclosed by a good wall, defended by a citadel on a rising ground, adorned with several beautiful tombs. It is noted for its silks, and a species of carpets much inferior to those of Persia. The soil of the country is rich and well cultivated. It contains many ruinous villages, and has on the whole an aspect of decay; but the greater part is still irrigated by means of Persian wheels. This country is unfortunate in a frequent change of masters, who devastate and pillage it in succession. In 1818 it was taken by Runjeet, who probably still holds it.

Bahawulpoor is a principality of considerable extent, the strongest place of which is Derawul, which owes its power of resistance in cases of invasion to the sterility of the surrounding sands. Ooch is a town in this principality, situated at the place where the Sutledge flows into the stream formed by the junction of the four upper rivers, to complete the Punjnud which carries the waters of the whole Punjâb into the Indus. Elphinstone says, that the Punjnud flows into the Indus at Ooch, but it is probable that in the dry season that confluence takes place much lower down. Ooch must have been of more importance in former times than it is now, as it gives name to an Indian dialect considered as distinct, though akin to the Bengalee and Hindostanee.[a]

Sinde, being tributary to the Afghân sovereign, has already in some measure, come under our notice, and the nature of the country has also been described in a preceding part of this volume.[b] Its boundaries are Mooltan and Afghânistan on the north, Cutch and the sea on the south, the sea and Baloochistan on the west, and Adjemere on the east.[c] To the east of the Indus it is quite level. It carries on a considerable commerce with the adjoining parts of India, but nothing approaching to what it did in former times, and it has greatly declined under the present rapacious rulers, the Ameers. These belong to the Sheeah sect of Mahometans, but are tolerant both to heretics and to infidels.[d] The population consists chiefly of Hindoos, Juts, (or converted Hindoos,) and Belooches. Sinde has declined greatly in population and fertility. An extraordinary number of tombs and burial grounds are scattered over districts now in the state of deserts. Some of the best of the soil is appropriated in large tracts as hunting ground by the Ameers, who are passionately fond of that amusement. The country swarms with military adventurers, and furnishes mercenaries for the infantry of the native Indian powers. The army of the Ameers amounts to 36,000 cavalry.[e] The territory contains many wretched mendicants, and also a set of proud and arrogant beggars, who pretend to be descendants of the prophet.[f]

Hyderabad is the modern capital. The fortress stands on a rocky hill on the margin of the Fulalee branch of the river, and possesses great natural strength; some handsome mosques are contained in it. *Tatta*, lower down the Indus, was formerly the capital of Sinde. Here the old English factory still stands, and is the best house in the whole province. The surrounding soil is rich, but the city is miserably decayed, though once a flourishing place. It is mentioned in Mahometan history as early as the year 92 of the Hegira, or A.D. 677. Dr. Robertson supposes it to be identical with the ancient *Pattala*.[g]

The Chinganes, a predatory horde who live near the mouth of the Indus, have been supposed by some modern authors to be the original stock of those bands of wanderers known in Europe under the names of Zingarians, Bohemians, and Gypsies,[h] who excite a mingled feeling of horror, curiosity, and even tenderness, by the abject lives which they lead in the bosoms of forests, their skill in a few trades, their indolence, their noisy mirth, their wild dances, and their pretended knowledge of futurity. We are told that some of them call themselves *Sintes*. The Persians call them black Hindoos. In their language, though little known, there have been found a hundred words common to it with the Hindoo languages of Mooltan and Bengal.[i] Pallas found the Indians who visited Astrachan to speak a language which had many words in common with that of the Zingarians or Gypsies of the Russian Ukraine.[k] Another traveller, Paulin de St. Bartholomé, has compared the dialects of Tatta and Guzerat with that of the Bohemians of Italy and Hungary.[l] Some have even fixed the epoch of their emigration as coinciding with that of the ravages of Tamerlane. It was just half a century after this that the wandering Bohemians attracted notice in Europe. This hypothesis has been ably elucidated,[m] and is received by many of the learned; but not by all. Some have attempted to show that the *Sigynni* of the Danube, known to Herodotus,[n] or the *Sindi* of the Cimmerian Bosphorus, were the ancestors of our modern Gypsies.[o] Others lay great weight on some Coptic words found in use among the Zigeuns,[p] and on the term gypsy, (or Egyptian,) applied to them in England. Others lean to the opinion of the Turks, who consider the *Zingari* of Cairo and Constantinople as having come originally from Zanguebar in south-eastern Africa.[q] At all events,

[a] N. of Sinde is the district of Cutch Gundava, subject to the Beloochee Khan of Kelat. It extends 120 miles N.—S. It is bounded N. by Sewestan, W. by the Brahooich mountains, and E. by a desert extending to the Indus. The population are principally Juts. The territory is divided into fiefs subject to Belooche and Brahoohee chiefs. Grain, cotton, and indigo, are principally cultivated. Gundava is the capital. *As. Journ.*—P.

[b] P. 331.

[c] Sinde is bounded on the N. by Cutch Gundava, Shikarpoor and Daood Putra; on the S. by the sea and Cutch Bhooj; on the E. by the desert; and on the W. by the Belooche districts of Lus and Jhelawan. *As. Journ.*—P.

[d] The Mahometan population are principally Sunnites.—P.

[e] The Sindee levies amount to 50,000, at the farthest.—P.

[f] In 1812, there were three Ameers, (two brothers and their nephew,) who divided the authority and revenues between them. Though nominally subject to Caubul, they paid no tribute. They had conquered part of Joudpore. Later accounts represent Sinde as tributary to Runjeet Singh. *As. Journ.*—P.

[g] Patala, Patalene. D'Anville.—P.

[h] Called also Zigeuner, (Germ.) Zigduns, &c.—P.

[i] Adelung's Mithridates, I. p. 244, &c.

[k] Neue Nordische Beytræge, III. 96.

[l] M. Alter on the Sanscrit, p. 172.

[m] Grellman's Historical Essay on the Zigeuns. Richardson, in the Asiatic Researches, VII. No. 9.

[n] Σιγυναι, Herod. Σιγιννοι, Strab. Σιγυμνοι, Orph. Σιγυννοι, Apoll. Rhod.

[o] Hasse on the Zigeuns of Herodotus, a German work, published at Kœnigsberg, 1803.

[p] *Romi* is the word for men, both in Coptic and the Zingar, or Gypsy language.

[q] A manuscript note of M. Paultre.

the great number of Indian words which they use shows some ancient connection with Indostan.

Chalchkân is a country once considered as a desert, from never having been explored, but now found to contain many cultivated spots, with small chiefdoms, and fixed tribes. On the north it is bounded by the province of Adjemere ; on the south by the great salt morass called the Runn, which separates it from Cutch, on the west by Sinde, and on the east by the province of Guzerat: it lies chiefly between the 24th and 25th degrees of north latitude. The most powerful chiefs in this tract of country are the Beloochee Kosahs, who settled in it about forty years ago, and are named Siryes by the aboriginal inhabitants. They are a set of sanguinary thieves, who infest the whole neighbourhood to great distances, moving in bands from 100 to 500 strong. They are originally from Sinde, and to that country they carry their dead for interment.

Between Sinde on the west and the Guzerat on the east, lies the province of Cutch,[a] along the sea-shore, 140 miles long and 95 broad. Its geographical position is rather singular. The hilly portion is not deficient in fertility and verdure, and is productive wherever the government gives due tolerance to the industry of the cultivator. The interior is studded with hills mostly covered with wild jungle, where the chiefs have their strong holds and dens, and from whence they either plunder or protect the intervening valleys, as best suits their purpose. The greater part of the province, however, is poor and barren, and the rains uncertain. The most material part of the cultivation consists of three crops obtained by irrigation. In some seasons water is extremely scarce, and carried from great distances. The chiefs boast of their independence, and no country can well be more impracticable for an invading army. The villages are all fortified, and some in a very respectable manner. Female infanticide has long been common, and probably still is so in this province. Prior to 1800, the number of infants annually destroyed among the Jareiah tribes was supposed to be 2000. Other accounts made it much larger. The government of Cutch is extremely unsettled. The Raja or Row, has of late years been superseded for the cruelty and absurdity of his conduct, which had excited universal dissatisfaction. Some interference took place on that occasion on the part of the British, who sent a force from Bombay which reduced Bhoodje the capital. This territory being inhabited by a warlike race, fond of independence, but unambitious of conquest, is considered as a strong defence on the frontiers of the British possessions against the restlessness of the Sindeans on the north, whose attempts to enter Cutch have been steadily opposed by British diplomacy. The Mahometan religion has been, and probably still is, making great progress in this part, and the Hindoo worship seems likely, in no long time, to disappear. The Runn forms a remarkable feature in the physical geography of Cutch, being a salt marsh of 8000 square miles, bounding that territory on the east. Its breadth varies from five to eighty miles across, between Cutch and Guzerat. It is said to be formed by the overflowing of the river Puddar[b] and the Gulph of Cutch, probably chiefly, if not wholly, by the former, as in December, during the dry season, it is quite dry, and in most places hard. It is a dead flat, totally devoid of verdure and vegetation, strewed with dead prawns, mullets, and other fish, and frequented by large birds. On the Cutch side it is visited by apes and porcupines. On the opposite, the incrustations resemble snow. In the dry season it has been crossed by armies and embassies. The banks of the Runn are frequented by wild asses in droves of sixty and seventy at a time. Bhoodje, the capital of Cutch, is a place of considerable strength, both natural and artificial. Mandavie is the principal sea-port, possessing an excellent harbour, and maintaining an extensive trade. Anjar is a small district of Cutch, which was ceded to the British in 1816. It is in contemplation to form a number of tanks here for extending the cultivation of the country. There is a general law always observed in Cutch, that every person who chooses to sink a well is entitled to the possession of the whole unoccupied land which it is capable of irrigating. The capital, Anjar, was garrisoned by 300 Arabs, when it was taken in 1816 by the detachment of Colonel East. Janagoor, is a town with a strong citadel, placed by Rennel on the river Banâs, which runs in a course parallel to that of the Puddar, both being nearly dry, except in the rainy season.

The extensive province of Guzerat—320 miles long and 180 broad—is chiefly situated between the 21st and 24th degrees of north latitude ; and is bounded on the north by the province of Adjemere ; on the south, by the sea and the province of Aurungabad ; on the east, by Malwah and Kandesh ; and on the west, by portions of Sinde, Cutch, and the sea. A considerable portion of this province in the interior is hilly, and much covered with jungle, which is encouraged by the inhabitants as a protection from invaders. Within these places, however, dwell many tribes of professed thieves, a great proportion of whom are cavalry, and extend their depredations to a great distance. The coasts of the peninsular portion of Guzerat abound with creeks and little inlets, which, by furnishing shelter from cruizers, by reason of their difficult navigation, are particularly adapted to the encouragement of piracy. This province is traversed by several noble rivers, as the Nerbuddah, Tuptee, Mahy, Mehindry, and Sabermatty, but in many places a scarcity of water is experienced. In the sandy soil, to the north of the Mahy river, the wells are from 80 to 100 feet deep. The country is very much intersected by ravines, and broken up by the rains, the chasms being converted into rapid rivers in the rainy season. The soil in general is fertile but little improved. The districts possessed by the British are very improveable, but their improvement has been greatly retarded by the contests which have, till lately, been maintained with the neighbouring states. Here the baubul tree yields a gum by exudation, which is used as food by the poor inhabitants of the jungles. This province exhibits a vast variety of sects, castes, and customs. The Grassias are a numerous class of ambiguous landholders, belonging to no particular caste or

[a] This province is called Cutch Bhooj, to distinguish it from Cutch Gundava, N. of Sinde. It is now under British subsidy, and a British force is stationed at Bhooj. *As. Journ.*—R.

[b] Padder.

race otherwise distinct. Their claims are considered as oppressive and vexatious, as well as dubious in their origin, resembling the black mail once existing in Scotland, a demand in compensation for a forbearance in plunder. These demands are prosecuted by menacing means in defiance of any fixed law. The Coolies are a most untameable race of plunderers, who delight in blood and nastiness, and despise every approach to civilized habits. They live chiefly on the river Mahy. The persons called Bhatts, a sort of religious order, abound most of all in Guzerat. Some are cultivators of the land, most of them are keepers of records, beggars, or itinerant bards. Some of them become securities in the money transactions of others. Allied to these are the Charons, a sect of Hindoos, who possess great droves of animals of burden, by which they carry on a distant traffic. Charons and Brahmins engage to protect travellers. When those under their protection are threatened, their plan is to take an oath to die by their own hands in case their protegé is pillaged, and in such veneration are they held by these robbers that this threat is almost in every case sufficient to restrain them. The Bhatts formerly acted as securities between the Mahratta government and its subjects, the one demanding Bhatt security for the payment of the revenue, and the other the same against the oppressive treatment of the ruling powers. Here, as in other parts, are Ungreas, or money carriers, who conceal in their clothes the money committed to their charge. They are persons of athletic strength, well armed, and though miserably poor, are entrusted with large sums with perfect security. The Dheras or Pariahs are a degraded caste, employed in the vilest work, and obliged to live in huts separated from the rest of society. The other Hindoo castes also exist here as in the rest of India, though under different appellations. The sect of Jains is more numerous than in any of the adjoining countries, and they have many beautiful temples with well wrought images of stone and metal.

Besides its native tribes and castes, Guzerat contains nearly all the Parsees of India, the remains of the followers of the Persian Zoroaster. When the Mahometan religion gained the ascendancy in Persia, they retired to the mountains of their own country, where they remained till the overthrow of the monarchy, and the death of Yezdigird, their last sovereign. Finding themselves treated as outlaws, they wandered towards the port of Ormuz, then governed by a branch of the old royal family, where they resided fifteen years, and learned ship-building and navigation. After this they repaired to the isle of Diu in this part of India, where they remained nineteen years; then, becoming too numerous for so confined a place, they sought a wider habitation, by going to Guzerat, where they were favourably received at Seyjan by Jadu Rana, a Hindoo prince. Here they first lighted up the sacred fire. Afterwards many of them settled in various other places in this quarter of India, such as Surat and Bombay, where they have increased rapidly in numbers. After their voluntary dispersion, the Seyjan chief requested their assistance in opposition to the Sultan of Ahmedabad, a bigoted usurper, who about A.D. 1450, detached an army of 30,000, to levy tribute from him. About 1400 Parsees joined the chief on this occasion, and beat the Mahometan Sultan in the first instance, though he afterwards gained his object. This is the only political or military transaction in which the Parsees have been engaged during 1000 years that they have resided in India. They have, since that time, lived in different communities, along the coast, from Diu to Bombay. Their modern population is divided into two grand classes, the Mobid, or clerical class, and the Behdeen, or laity. A Mobid may marry a Behdeen female; but Behdeens are not allowed to take wives from Mobid families. They often bring up other people's children, and admit them among the Behdeens; and sometimes they admit adult proselytes, where they can place confidence in their adherence to the laws of Zoroaster. These last adoptions, however, are rare. The Parsee females are, by the laws of their religion, placed on an exact equality with the men, and have long maintained a character for unspotted chastity. The children, like those of the Hindoos, are betrothed between the ages of four and nine, and the marriage takes place within the ninth year of the girl's age. If a betrothed girl dies, the guardians of the boy look out for a girl who has, in like manner, lost her intended husband. Among adults, widowers only marry widows. They employ a dog to watch the corpse of a dead person, believing firmly that dogs see aerial beings which are invisible to men, and keep them off by their howlings. They have a great dislike to touch a dead animal, and especially a hare. They have adopted the dress and many of the customs of the Hindoos, and have forgot their own language for that of their present country. Very few think of studying the language or antiquities of their own nation. At present, the young men of their best families are taught to read and write the English language. The opulent among them are merchants, ship-owners, and landholders; the inferior classes are shopkeepers, and exercise such mechanic arts as are not connected with the use of fire; but the manufacture of metals is not practised by any among them, nor do they become soldiers or sailors, as the use of fire-arms is contrary to their religious precepts. At Bombay, many of them act as interpreters and domestic servants to Europeans. The clerical tribe is distinguished by white turbans, but they follow all kinds of occupations, only a few of them being selected for the performance of religious ceremonies. Some of them read and write the Zend or Pehlvi character, but their knowledge is extremely superficial. The Parsees, devoted to the pursuits of commerce, are not addicted to any kind of literature. A recent innovation respecting the commencement of their new year, has occasioned a separation of this ancient and long united people into two sects, the one celebrating the new year and their other religious festivals a month later than the other. The places in which they are at present collected in greatest bodies are Diu, Cambay, Broach, Oclaseer, Hansoot, Veriou, Surat, Nowsarry, Damaun, Bombay, and Urdwara. This last place is the chief residence of their priests, and the depository of the sacred fire which they brought from Persia. In their original country, they have been reduced by persecution to a small number, who are chiefly collected in the city of Yezd, where they occupy about 4000 houses.

These also are a very industrious race, but much oppressed by the Persian government, paying a poll-tax of twenty piastres, and subjected to perpetual extortions of other kinds.[a]

There is a singular race in this part of India called Borahs, professing the Mahometan faith, who have Jewish features, and form every where a distinct community, noted for frugality and address in bargaining. Boorampoor[b] in Khandish is their chief place, and the residence of their head Moollah. They go about as itinerant pedlars in Guzerat and the adjacent provinces.

There are numerous manufacturing looms in this province, all the castes, excepting Brahmins and Banyans, occasionally following the occupation of weaving. The Surat manufactures are famed for their excellent quality and moderate price. The trade of this province is far from being equally flourishing as under the Mogul government, even in its most turbulent periods.—It is the custom, when a merchant finds his affairs involved, to set up a blazing lamp in his shop or office, and abscond till his creditors have examined his property. Till such time as he has obtained his discharge, he wears the tail of his waist-cloth, not hanging down as usual, but tucked up. Persons who adopt these steps in good time, so as not to do their creditors much injury, are greatly esteemed, and often become subsequently more prosperous than they could have otherwise been; hence some have even set up the bankrupt light without necessity, with a view to the future patronage of the public. Guzerat is very thinly peopled in some parts, as the north-west; in others, as about Surat, it is extremely populous. The people live in village groups for security, whereas on the Coromandel coast the dwellings are detached. The horrid practice of female infanticide was lately very prevalent among the Jarejah tribe, to which the chiefs of the Guzerat peninsula belong; but the British authorities at Bombay have exerted themselves to suppress it, so that it is not now openly practised. Another crime of common occurrence was one which went under the name of Jhansa, consisting in writing threatening letters, and destroying the property of others, in order to enforce compliance with some unjust demand. This is now becoming less common and less violent, from the regularity with which civil justice is administered.[c]

Guzerat was first invaded by Mahmud of Ghiznee, about A. D. 1025. It was subject to the Mogul power for many years. In the fifteenth century it became independent under a dynasty of Rajepoot princes, who had embraced the Mahometan faith. It was again reduced by Akber in 1572. After the death of Aurengzebe, in 1707, it was overrun by the Mahrattas, and in a few years finally severed from the Mogul throne. At present the more civilized parts are possessed by the British, who occupy a considerable tract on both sides of the Gulf of Cambay, including the populous cities of Surat, Broach, Gogo, Cambay and Bhownugger. The sea coast from this to the Gulf of Cutch is in the hands of several petty chiefs, some subject to the Guicowar, and others independent, addicted to piracy, but now restrained by the British, who have a detachment of the Bombay army cantoned at Palyad, in the west of Guzerat, for that purpose.—The district of Puttunwar in the north-west, is thinly inhabited, and not thoroughly explored.—Neyer, adjoining to it, is remarkable for its fine horses.—There is a district at the mouths of the rivers which flow into the Runn called Jutwar, being in a particular manner the country of that description of people called the Juts, who also exist in Sinde and the Punjâb. They are of Hindoo extraction, but converted to the Mahomedan religion. They are professed and determined plunderers, yet industrious among themselves, and some of their settlements are remarkably populous. The Jut women exercise an influence over the men which is rare among Mahomedans. A woman can, when she chooses, leave her husband, and marry another. When she wishes to take such a step, she persecutes him, assisted by her female acquaintance, till he acquiesces in a separation. Being much respected by the men, the Jut women sometimes act in the capacity of protectors to persons and their property.

It is the peninsular part of this province that forms its leading geographical feature, being the only lateral projection of any considerable size, by which the smooth outline of the extensive coast of India is diversified. Its length, from east to west, is 190 miles, its breadth 110. It is sometimes called the Cattywar, a name given to it by the Mahrattas, probably in consequence of having been first opposed there by the Catties, one tribe of its inhabitants. It has several small rivers. The mountains are few and not high. The loftiest of those called the Junaghur hills is sacred. The Catties, Jarejahs, and some other tribes in this quarter, are a sort of imperfect Hindoos, believing in the Brahminical legends. They worship the sun, are superficially acquainted with the doctrines of their professed creed, and relaxed in the observance of its rules of diet and other peculiarities. The practice of female infanticide, which prevails among them, arises from the difficulty of finding husbands for all their daughters, because they will not marry them to any except the respectable castes of Hindoos. The illegitimate daughters are not put to death, because they can be married to persons of impure caste, or to Mahometans indiscriminately. The self immolation of women is also common; and it is remarkable that it is far more frequently done by concubines on the funeral piles of their lords, than by wives on those of their husbands. Doaraca, a small island, is a place of peculiar sanctity in this quarter, containing a temple much resorted to by pilgrims, who, among other ceremonies, go through that of receiving a stamp on their bodies with a hot iron, on which are engraved the shell, the ring, and the lotos flower, the insignia of the gods. This privilege costs a rupee and a half, or about three shillings. It is frequently impressed on infants. A pilgrim, besides his own stamp, sometimes has his body stamped for the benefit of an absent friend. From this place the chalk is taken with which the Brahmins mark their foreheads all over India; it is reputed to have been deposited there by the god Krishna. Numerous ridiculous

[a] A full account of their religious creed is given in Malcolm's History of Persia.

[b] Burhampour.

[c] Forbes's Oriental Memoirs. Hamilton's Description of Hindostan, vol. I. p. 604.

fables are connected with the same locality. The district of Soreth at one time comprehended a large proportion of the Guzerat peninsula. The ancient residence of its Rajahs was at Runtella, but afterwards transferred to Junaghur, a city three miles round, at the foot of mount Ghirnal. On the top of that mountain are several pagodas surrounded with grottos inhabited by Hindoo hermits of different sects. The district is exceedingly fertile. It was formerly infamous for the piracies of its inhabitants, especially those committed by a Rajepoot tribe called Sangarians, whose chief place is Noanagur, but these are kept down by commercial treaties with the government of Bombay, one article of which is to allow no such lawless acts. In 1808, Colonel Walker imposed a fine of 40,000 rupees on Hamed Hassan Balis, the Mahometan chief of Soreth, for piracies committed by his subjects and connived at by himself.—The isle of Diu, at the south-west corner of the peninsula, contains a Portuguese town, with a harbour, still frequented by the Arabs.

The ancient city of Cambay is remarkable for its subterranean Hindoo temples, formed since the Mahometan invasion. The houses of opulent persons have also subterranean apartments. The city was formerly celebrated for its manufactures of silk, chintz, and gold stuffs; but they have gone to decay. The neighbourhood contains mines of rock salt[a] and also of agates, and the manufacturing of the latter into ornamental cups and vases forms a branch of the industry of the place.

Surat is the most conspicuous trading city in this province. It is situated on the south bank of the river Tuptee, in latitude 21° 11′ N. and longitude, 73° 7′ E. The outer walls are seven miles in circumference. The inner town has also walls with twelve gates, and a number of towers; but all in a ruinous condition. It is not the policy of the British government to keep up many fortifications of any kind. The mosques and temples, the Nabob's palace, and all the public buildings, are mean and insignificant. The most remarkable institution is the Banyan hospital for sick, wounded, and maimed animals; an institution dictated by the religious tenderness which the Banyan sect cherishes for the animal creation. It is inclosed by high walls, and subdivided into numerous courts for the accommodation of the different species. In sickness they are attended with the utmost assiduity, and provided with an asylum in old age. In 1772, it contained horses, mules, oxen, sheep, goats, monkeys, poultry, pigeons, and various other birds: also an aged tortoise, which was known to have been there seventy-five years. There was even a ward for rats, mice, bugs, and other noxious animals, and suitable food provided for them. This city has long been a place of great trade, though twenty miles from that part of the river where the vessels are obliged to cast anchor. The harbour is not on the whole commodious, though one of the best on this shore in northerly winds. It is one of the most ancient cities in India, being mentioned in the Ramayuna, a Hindoo poem of great antiquity. In 1800 this city, and the district to which it belongs, fell under the power of the English; previously to which it had been exposed to the most destructive contests between the reigning Nabob and the Mahrattas, as well as to all the violence of lawless predatory bands. It used to be a common thing for the inhabitants of the town to hire bands of Coolies from the neighbourhood, to plunder one another's property;—these thieves being admitted during the night, and secreted in cellars till their opportunities were matured. It is suspected that secret poisonings are common among the Hindoos in this city, instigated by jealousy, revenge, and the cupidity of relations and heirs. At present no offensive weapons are allowed within the walls. In 1796 the population was about 600,000. It is kept down by diseases, especially the small pox. Vaccination is objected to both by the Parsees and the higher classes of the Hindoos, as staining the purity of their caste.

The city of Ahmedabad was the Mahometan capital of Guzerat. It is situated on the east bank of the river Sabermatty, and forty miles north from Cambay. It was one of the largest capitals of the east, and was one of the four cities which, in the reign of Akber, possessed a royal mint. It is said[b] to have contained a thousand mosques, and to have extended to Mahmoodabad, which is now ten miles off. A century ago it contained eleven great Hindoo pagodas, three hospitals for animals, and streets[c] beautifully lined with citron and cocoa trees. At present its ruins occupy an area thirty miles in circumference, but its walls are only five miles and a quarter in extent. About the middle of the 15th century, it was the capital of a flourishing independent kingdom. In the early part of the 18th century, the Mogul governor assumed the sovereignty. It afterwards fell under the Mahrattas, but in 1779 it was stormed by the British, under General Goddard. Since that time the Peshwah of the Mahrattas and the Guicowar have shared the sovereignty by an ill-understood agreement, and it has been subjected to much anarchy.

Baroda,[d] to the east of Cambay, is the capital of the Mahratta prince known by the family name of the Guicowar, who is much befriended by the English, having sided with them in most of their disputes, and whose power is of considerable extent in the province of Guzerat.

The city of Broach, the *Barygaza* of the ancients, forms with its territory part of the English East India Company's possessions. The soil is uncommonly fertile. The people are quiet and orderly compared to many of their neighbours, and the administration of civil justice in the hands of their present rulers has been remarkably successful. The compactness of the district has also rendered it more practicable than in most others to give full protection from marauders by the establishment of patroles.

To the north of Guzerat, in an inland and central situation, is the province of Adjemere or Rajepootana; so called from the race of Rajepoots which possesses it, being in an intermediate position between the Seiks and the Mahrattas.[e] Its length from north to south is about 350 miles, and its breadth about 200. It has a sandy soil, and in general presents a desert and dreary appear-

[a] "Salines."
[b] By Persian authors.—M. B.
[c] "Marchés," market-places or squares.—P.
[d] Brodera.
[e] See the Memoirs of George Thomas.

ance; a great portion of it is a waved surface of mere sand, which often rises in clouds, though in winter it exhibits a little verdure, and becomes firmer from a vegetation of grass called *phoke*, the thorny bushes called *baubul*, and the jujube. The villages consist of miserable straw huts, with low sides and conical roofs, surrounded by hedges of dry thorn. The thirsty fields, which depend on dews and periodical rains, are cultivated with the poorest kinds of pulse, and *Holcus spicatus*, called badjera. Water melons, however, grow in great profusion, and of a large size. The wells are often 300 feet deep, and some only three feet in diameter, lined with masonry. To the east of Bahawulpoor, the road for the caravans is over a hard and sounding clay, totally destitute of vegetation. Near that place the country begins to be well cultivated. The periodical rains are allowed to be absorbed by the sand immediately when they fall, the state of human industry being low and helpless. The common inhabitants are Jauts; the higher classes Rhatore Rajepoots. The former are black, little, and wretched in their appearance. They form a powerful sect of Hindoos, making part of the fourth caste, and known in history from the time of Aurengzebe.[a] The latter are stout and handsome, with hooked noses and Jewish features, haughty in their manners, and almost constantly intoxicated with opium. Bullocks and camels constitute the live stock. The wild animals are,—the desert rat resembling a squirrel, the fox, the antelope, and the wild ass. This province is almost destitute of rivers. The mountain streams of the more hilly parts quickly disappear. In the southern quarter, a portion of it is watered by different streams, as the Chumbul, which sends its waters to the Ganges, and the Banass, which runs west, and falls into the great morass called the Runn. The three chief divisions of this province are,—Odeypoor in the south, Joodpoor in the middle, and Jeypoor in the north. The Rajepoots live under a sort of feudal system. They are brave, and much attached to their chiefs. Their number, though not ascertained, is supposed to be little more than three millions. This country was never completely subjugated by the Mogul power, though it paid tribute, and furnished a number of mercenaries to the imperial army. After the death of Aurengzebe in 1707, it continued nominally dependent on the throne of Delhi; but in 1748 the chiefs assumed a state of independence. Since this time the country has been a scene of civil war and plunder, being dreadfully overrun by the Mahratta armies, and infested by various predatory tribes. The Rajah of Biccanere is the least important. The Odeypoor Rajah is reduced in power, but respected as the purest of the race. In 1807, the Rajahs of Jeypoor and Joodpoor disputed for the honour of marrying the daughter of this high-born chief, and suffered their dominions at the same time to become a prey to Ameer Khan, Holcar, and Sindia. In this state of constant uneasiness and wretchedness, all the Rajahs successively have entreated to be connected with the British government—a change which took place in 1818; but is more satisfactory to the people and cultivators than it is to some of the great lords, who were aiming at the possession of separate independence. Their armies were taken into British pay, and placed under British officers,—their own officers being pensioned off. Sir David Auchterlony, by whose skill and address these objects were accomplished, enjoys the dignity of resident and commander of the forces in Rajepootana. Agriculture, and the other arts of peace, begin to attract attention, though ferocious habits must retain some influence for a time.

The town of Adjemere, seven miles in circumference,[b] was formerly the capital, but contains no trace of magnificence except the remains of a palace built in a garden by Shah Jehan.[c] The streets are narrow, the houses small and in a state of decay. The principal attraction connected with it is a tomb of Khaja Moyen ud Deen, one of the most distinguished Mahometan saints of India. It is of marble, but destitute of elegance. To this tomb the great Akber made a pilgrimage on foot. Upwards of 1100 resident priests subsist on the contributions of the devotees.

The north-east part of Adjemere is inhabited by a predatory horde called Bhattees.[d] They were originally shepherds and Rajepoots, but are now Mahometans. They differ from other Mahometans in allowing their women to appear in public. George Thomas says that they could muster 20,000 men. In consequence of their insufferable aggressions on the neighbouring territory of Hurriana, on the east, belonging to the British, they have been reduced, and their forts destroyed. Some of their towns which had been separated from Hurriana were re-annexed in 1816.—The principality of Biccanere, lying south from the Bhattee country, is arid and barren. George Thomas says that the force of the Rajah amounted to 8000. Mr. Elphinstone, on his mission to the court of Caubul, was kindly received by this prince on his way, who offered him the keys of his fort as an acknowledgment of his submission to the British,—an offer which the other did not accept of. At this time his territory was invaded by five different armies, in consequence of his taking part in the contest between the two Rajahs already mentioned. The army of the Rajah of Joodpoor was 15,000 strong. His mode of defence was to fill up all the wells within ten miles of his capital. He solicited the interposition of the British mediation, which was not granted; but soon after, in consequence of an application to the resident at Delhi, he received back some towns originally belonging to him, which had been taken by the Bhattees. At last, in 1818, his separate existence as a prince, (if that can be called independence,) was secured by his being admitted within the pale of British protection. Biccanere, the capital, and the towns of Chooroo and Pooggul, in this territory, have nothing in them worthy of notice.

To the south of this principality, and in the west part of the province, lies that of Jesselmere. From this Joodpoor lies east and a little south; an arid territory, containing lead mines. Its population is greatly di-

[a] See Forster's Travels, t. III. p. 104. Note 3d. (Fr. trans.) and Wahl, II. p. 385.

[b] "3 Fr. leagues."

[c] To the E. of the city, the emperor Akber erected superb edifices of white marble, with a beautiful garden, on a hill. *Tiefenthaler*, I. 220.—M. B.

[d] "Batniens."

minished from what it was in former times. Their character is said to be frank, brave, and generous. The capital, Joodpoor, is of considerable size, destitute of springs or wells, and supplied with water by a large tank cut in a rock. It includes Marwar, a district which, in 1812, became a prey to all the horrors of famine, from the failure of the annual rain of the preceding year. The inhabitants fled to Guzerât, where the vicinity of every large town was crowded with the dying and the dead, half eaten by dogs. Their Brahmins, forgetting the distinction of caste, sold their wives for a few rupees. The hand of charity was opened as liberally as possible, but was quite unavailing to alleviate a calamity so extensive, and it is believed that not one in a hundred lived to return home. The Shekawutty country is straight east from Biccanere. Bhuil is a considerable town belonging to it, situated on the high road from the Punjâb to Biccanere. Here the merchants are oppressed with severe exactions, and sometimes entirely plundered. Its tribes are considered as subject to the Rajah of Jeypoor, but have the character of refractory subjects. The Jeypoor principality is situated in the eastern part of Rajepootana. It produces salt, copper, alum, blue vitriol, and verdigrise. It is compact, and comparatively fertile and populous. In 1805, during the British contests with Scindia and Holcar, the Jeypoor court kept on good terms with both parties while the struggle was doubtful, that it might afterwards join the strongest. In consequence of some temporary successes of Holcar, the Rajah joined him against the British, and was subsequently guilty of gross tergiversation towards the latter power. A prejudice against the British was strongly excited, as beef eaters and shooters of peacocks: this induced Lord Lake to prohibit the slaughter of cows near any of the sacred places, which had the effect of pacifying the minds of the Hindoos. In 1818, this was the last of the Rajepoot states which sent negociators to Delhi; and, after much difficulty, a treaty was arranged, though some of the chiefs still attempted to withhold compliance with its conditions. Jeypoor, the capital, is modern, handsome, and regularly built, and the streets spacious and straight. The citadel is built on a steep rock, which has round it a chain of fortifications four miles in circumference. Near it there is an astronomical observatory, provided with good instruments.—To the south are some petty states, as Kotah, on the Chumbul river. Bhoondee is another, the Rajah of which, in 1805, reduced himself greatly by some services which he rendered to the British army during a disastrous retreat, but was, at the subsequent pacification, scandalously neglected, and left at the mercy of the Mahrattas. In 1818, however, when he was received within the pale of British protection, his interests were attended to with a laudable care. Not only was he, in common with the others, placed in a state of security highly gratifying after a long experience of extreme wretchedness, his country having been the seat of the most savage war and plunder, but several possessions, of which his enemies had deprived him, were restored. The hills where Boondee, the capital, stands, are inhabited by the Meenas, a set of robbers, who, among other enormities, are addicted to the stealing of children, whom they sell for slaves.

Odeypoor, on the southern boundary of Rajepootana, is one of the most honourable principalities, but miserably reduced by intestine disorders, and the oppression of the Mahrattas. It is well adapted for vegetation, being hilly and well watered. But its political condition is greatly disorganized, the Ranah[a] being weakened in his mind by misfortune, and destitute of respectable counsel or support among his subjects. These circumstances are said to be somewhat ameliorated, though rather in promise than by any thing being actually established. The capital of the same name acquired in 1818 an accession of several thousand inhabitants on the emancipation of the state from the Mahratta yoke. It is situated in a valley surrounded by mountains, and to which the only access is by a narrow defile. This valley contains also some hundreds of villages, but has the character of being unhealthy.[b]—Chittore, a town and fort belonging to Odeypoor, is situated on the top of a high and rugged mountain, about eight miles in circumference; it is reckoned a place of great strength. It was for several centuries the capital of a powerful Rajepoot principality, and much celebrated for its riches and antiquity, as well as strength, when it was taken by Akber, in 1567. It had been in the possession of the Mahometans at a former period; being taken first by Allah ud Deen, in 1303; but does not seem, on either occasion, to have been permanently retained. It was taken and plundered again by Azim Ushân, the son of Aurengzebe. In 1818, when seen by a British detachment, it appeared naturally strong, but the works neglected and decayed, while the surrounding country, though naturally fertile, was in a most miserable condition.—Kumulnere is one of the strongest forts in Upper Indostan. Sarowy and Pertaubghur are two thinly peopled and uncultivated districts in the south-west.

We next proceed to the basin of the Ganges, to describe the countries situated on this mighty river, and its tributaries.

The province of Malwah lies to the south and a little to the east of Rajepootana, chiefly between the 22d and 25th degrees of north latitude, bounded on the west by Guzerat, on the south by the Nerbuddah river, on the east by the province of Allahabad, and on the north by Rajepootana and Agra. It contains the sources of the rivers Chumbul and Betwah, which fall into the Ganges. It is a central region of considerable elevation, with a regular descent from the Vindhya mountains on the south, extending along the north side of the Nerbuddah. But it is more fertile than the adjacent provinces; the soil consisting of a black mould, producing grain, and various vegetables subservient to commerce. It produces some fruits which cannot stand the heat of the lower provinces. The trade is conducted by land carriage, as the rivers are not navigable. The exports are cotton, coarse cloths, opium, and the root of the *Morinda citrifolia*. This province was subdued both by the Afghân and the Mogul sovereigns of Delhi. In 1707 it was overrun by the Mah-

[a] The chief of Odeypoor, called *Ranah*, was formerly chief of all the Rajepoot princes, and had under his orders sixteen lords, called *Surahs*.—M.B.

[b] Memoirs of George Thomas.

rattas, and in 1732 they separated it from the Mogul dominions, though several landholders, or Grassias, like those of Guzerat, continued to extort some practical acknowledgment of their rights by more or less violence.

In the southern division, especially amidst the mountains contiguous to the Nerbuddah and Tuptee rivers, the savage plundering tribe called Bheels, live in the jungle extending westward to Guzerat, where they meet the Coolies, and eastward to Gundwana, where they come in contact with the Gonds. All these races are averse to regular industry, prone to rapine, and sometimes employed by native chiefs to desolate the territories of their adversaries. A few of them are cavalry, but the greater part infantry, armed with bows, and almost naked. They profess the Hindoo religion, but from their ignorance, are careless of the observances connected with the Brahminical precepts of purity. They had acquired a degree of political consequence from their strength, when in 1818 they were subdued by Sir John Malcolm, and their chiefs came under an obligation to lead peaceable lives, and to protect the property of others. After this, an insurrection of Arabs and Mekranees, was formed under an impostor boy named Krishna, who was made to personate the reigning Raja. This insurrection was defeated, nearly 4000 were expelled, besides 2000 of Bapoo Sindia's Mewatdes, and Patans.—Chanderee, the chief town of a district of the same name, is very ancient, and was once a place of great splendour. Abul Fazel says it contained 14,000 stone houses, 376 market places, 360 inns, and 2000 mosques. It does not now correspond to so high a description, but it contains a manufacture of fine cotton stuffs. Seronge is a large open town. In the cold season, the thermometer here often descends below the freezing point, and water freezes during the night. It seems to have been formerly more populous than it is now, though still a flourishing place. It is one of the possessions of Ameer Khan, a Pindaree chief, formerly a freebooter, but now under obligations to abstain from that mode of life. He has several assignments of land, and pending claims in Rajepootana and the country on the east of the Chumbul; but Seronge, and Tonk on the Banas, are his principal possessions.

The district of Oojein is fertile. The vines bear a second crop of grapes in the rainy season, but they are sour. The city of Oojein, the *Ozene* of Ptolemy, situated in a vast plain, is considered by some as the capital of Malwa. It is the modern capital of the dominions subject to the Sindia Mahrattas. It is adopted by Hindoo geographers and astronomers as the first meridian. The modern town is about a mile to the southward of the ancient, which is said to have been destroyed by an earthquake about the time of Raja Vicramaditya, when it was the seat of arts, learning, and empire. Remains of ancient walls and pillars are found by digging in the site of the ancient city, and among them some pieces of wood of extraordinary hardness. The modern town is six miles in circumference, surrounded by a stone wall with round towers. The houses are of brick with wooden frames. The chief buildings are four mosques, and a number of Hindoo temples. It also contains an astronomical observatory. The waters of the Sipra, which flows near the city, are esteemed sacred, and Oojein itself is a place of pilgrimage. Sindia's palace makes a poor figure. The population has diminished of late, in consequence of many being attracted by the neighbouring town of Indore, where Holcar has fixed his court, formerly migratory. The officers and public functionaries are almost the only Mahratta inhabitants of Oojein. It is, in general, well supplied with provisions, but in 1804, when visited by a British embassy, several persons were seen dead and dying of hunger in the streets. These were said to be needy strangers, and the inhabitants were restrained from giving them relief by the dread of the consequences of any appearance of superfluity. In 1807, a treaty was concluded by the British with Sindia, by which he engaged to do his utmost to effect the extermination of the Pindarees, but his conduct was always suspicious till the battle of Maheidpoor, when the power of Holcar was suddenly annihilated.

Indore is the capital of the Mahratta chief, bearing the family name of Holcar, who has of late years made a great figure in the wars of India, having taken Poonah in 1802, and desolated the whole neighbouring country. —Bopaul is the capital of a small independent state, 100 miles east from Oojein, and near a lake which abounds in crocodiles. The country is naturally fertile, but neglected, and overrun with jungle, which has been for some years a place of refuge for all kinds of banditti, and the very centre of Pindaree influence. The town and territory are occupied by a colony of Patans, to whom they were assigned by Aurengzebe. The town is at present deserted and ruinous. Their Nabob is supported by British alliance, after having been long oppressed by the Pindarees and Mahrattas.[a]—Saugor was taken by the British forces under General Marshall in 1818, and was found to exhibit every appearance of an opulent and flourishing city, though in the heart of the Pindaree country. This whole district and neighbourhood are naturally strong, and part of the military force required to overawe central Indostan is stationed within the limits of the Saugor district.

The banditti, so well known by their predatory incursions under the name of Pindarees, at first occupied a small portion in the south of the Malwa province, but afterwards extended to the centre, and seemed in a fair way of soon absorbing the whole. This name was originally applied to a body of roving cavalry which accompanied the Peshwa's armies. When the Peshwa ceased to interfere with any territory to the north of the Nerbuddah, leaving that portion of the Mahratta empire to Sindia and Holcar, the Pindarees divided into two parties, according as they attached themselves to the fortunes of the one or the other of these chiefs. All the Pindaree leaders, and most of the men, were Mahometans, but they admitted all sects into their body, and formed a general nucleus for vagabond and disaffected persons, till the elements of confusion and destruction were gradually so concentrated as to form a dreadful scourge to India. Like the early Mahrattas, they systematically prosecuted a war of plunder and devastation

[a] See Prinsep's Narrative of the Political and Military Transactions of British India, under the administration of the Marquis of Hastings, from 1813 to 1818, p. 21, &c.

on all their neighbours, and were recently acquiring the consolidated form of one or more organized states. They lived in societies of one or two hundred. When an enterprising leader determined on a plundering expedition, he invited the neighbouring Thokdars, as the chiefs were called. The power of the leader was not hereditary, but founded entirely on the respect paid to his talents and enterprise. The submission paid to him was partial, except when in the midst of an enemy's country, when the safe return of the party depended on their implicit obedience to his orders. They moved in some measure at random, their previous information being seldom correct. The only object in the arrangement of their movements was to keep together. There was nothing systematic either in the attacks which they made, or in the division of the plunder, except that a part of the latter was set apart for those who were obliged to remain behind taking charge of the horses. They were excellent riders; their arms were swords and spears; fire arms, though they esteemed them for their execution, they disliked as too cumbersome. Nothing generous or brave, but every thing that was both mean and desperate, characterized their proceedings. To secure plunder by all means, and when attacked to escape in the securest manner, were their only objects. They undertook long journies of two or three months, through the midst of armed enemies. In 1814, their strength was estimated at 31,000. In the northern Circars, the devastation which they made, and the plunder which they carried off, were immense. They put thousands of individuals to the most inhuman tortures, to make them disclose their treasures, and many were barbarously murdered. As they were proceeding to convert all the finest part of India into a desert, it became the imperious duty of the British government to put an end to so formidable a series of atrocities. The Marquis of Hastings took the field against them in October, 1817, and, by a well concerted combination of movements, directed to their native haunts as to a centre, he expelled them by the end of November. In their attempts to take refuge, partly with Sindia, and partly with some subordinate neighbouring chiefs, they were disappointed. Arrangements were afterwards made, by which those of their own chiefs who surrendered were provided for as peaceable cultivators or proprietors, in districts not fitted by any natural strength to cherish their lawless habits; and this serious danger has thus been crushed. India is a country peculiarly liable to these irregular marauding combinations, which from time to time require to be put down; but it is seldom that they attain a strength so formidable as in the instance of the Pindarees, and, under the preventive measures now adopted in that country, such a power is not likely again to arise.

On the north of Malwah, between Rajepootana on the west and Oude on the east, and bounded on the north by Delhi, is the province of Agra. In its western and southern parts, this province is hilly and jungly; the rest is open, flat, and rather bare of trees. The climate is, generally speaking, temperate, but in winter it is really cold; and during the hot winds of summer, though these are not of long duration, the climate is unhealthy, especially in the hills. The Jumna, the Chumbul, the Ganges, and several smaller streams, such as the Sinde and the Koharry, flow through this province; yet it is not well supplied with water. To the north of the Chumbul, and on the western frontier, during the dry season, except in the immediate vicinity of the large and permanent rivers, water for agricultural uses is procured from wells. The soil is well adapted for indigo, cotton, and sugar, the crops of which articles are annually increasing in those portions which are immediately under British jurisdiction; in those which remain subject to native chiefs, agriculture is far behind. The territory between the Ganges and Jumna, which is called the Doab, is particularly fertile, and exports indigo, sugar, and cotton. It is more thinly peopled than Bengal and the more flourishing provinces. The population may be estimated at six millions, of which the Doabeh districts under British rule comprehend a considerable proportion. The natives are a handsome and robust race. The Hindoo is the prevailing religion, though the Mahometans have ruled here since the eighteenth century. The language in common use is the Hindostanee; the Persian is used for public documents, and also in conversation among the higher classes of the Mahometans. The Agra district of this province is notorious for the frequency of highway robbery, which is believed to be connived at or encouraged by the Zemindars, though under the British jurisdiction. Robbers, indeed, easily escape from the latter into the territories of native chiefs, where, after committing a robbery, they find a secure asylum.

The city of Agra occupies a wide plain on the north-west side of the Jumna, in the form of a crescent. It is supposed to have been the birth-place of the Avatar, or incarnation of Vishnu, under the name of Parasee Rama, whose conquests extended to Ceylon. According to Tiefenthaler, it is seven miles long, and three broad.[a] It is to the Emperor Akber that it owes its splendour; he gave it the name of Akber-Abad. Only a few of its monuments are left, among which is the palace of Akber, one of the finest buildings in Asia. It stands on an eminence; its walls of red granite present the appearance of a single block of stone;[b] it extends in a crescent shape along the river side, leaving between its walls and the water, a beach which is used as a harbour, where numerous trading barks and pleasure boats are continually arriving. Three days in the week, the great square of the palace, planted with several rows of oriental plane-trees, is employed as a market-place. Round this square a fine gallery extends, and at regular distances are six triumphal arches of entrance, leading from the same number of spacious streets. The middle of the square is ornamented with a stone statue of an elephant emitting a stream of water from his trunk. The palace has two immense galleries, adorned with twenty-four double columns of white marble, with pedestals of blue granite and capitals of yellow mica. The mosque belonging to the palace is entirely of mica, and resem-

[a] I. tab. 7. No. 2.

[b] Valentyn, Oud-end-Nieuw Oostindien, VI. 295. (Vie des Grands Mogols.)

bles a casket of precious pebble.[a] In the interior of the apartments, gold, marble, and sculptures executed in red, yellow, and black stone, occur every where in the greatest profusion. Round the great palace, seven small marble palaces, for the use of the princes, are ranged in symmetrical order. At a little distance from the citadel is the great mosque of Akber, a building superior to the famous mosque of Soliman at Constantinople. Its red granite walls are encrusted with plates of gold, from the cornice to the foundation. The mosque of Aurengzebe, on the river side, is supported by upwards of a hundred columns. Among the mausoleums with which this city is adorned are those of Akber and Shah-Jehan, of astonishing size and magnificence; but surpassed by that of the father-in-law of Jehan, the celebrated Noor Jehan Begum.[b] It is kept in repair by the English. On every side we meet with magnificent gardens. In the time of Tiefenthaler, there was at Agra a Jesuitical college, and a Christian burying ground, with a vast vaulted building, the walls of which were painted with all sorts of flowers, while a fountain of sweet-scented water played by their side. Agra formerly owed much of its flourishing condition to the industry of its inhabitants. The city was filled with store-houses, work-shops, sale-shops, and market places. Its trade has greatly declined, yet it still contains a great number of merchants, both native and foreign. According to the statement of Legoux de Flaix, it still contains 800,000 inhabitants. This must be an exaggeration, and so indeed are the accounts often given of its present magnificence. The English accounts reduce it to 60,000. This city had the honour of giving birth to Abul Fazel, prime minister of Akber, and author of the Ayeen Ackbery, or Statistical Account of Indostan. A lineal descendant of this meritorious vizier resided, and probably still resides here, Mustapha Khan, living on a pension which he has received under the successive rulers of the country. The Gallo-Mahrattan administration reduced that pension to fifteen rupees, L.1, 10s. per annum. In 1813, the British government assigned him fifty rupees per month.—Agra, with the rest of the province, fell under the sway of Madhajee Sindia, and continued in the hands of the Mahrattas till 1803, when it surrendered to Lord Lake. Among the artillery captured was one enormous piece called the great gun of Agra, twenty-three inches in calibre, fourteen feet two inches in length, the thickness of metal at the muzzle eleven and an half inches; weight of the gun, 96,600 pounds; the ball of cast iron which it received weighed 1500 pounds. In an attempt made to convey it to Calcutta, it broke through the raft and sunk into the river, in the bed of which it probably still remains.

The town of Futtipoor, to the south-west of Agra, owed its lustre to Akber. It has a stone wall of great extent, which seems never to have been filled with buildings. The only monument is the tomb of Shah Selim Cheestee, by whose prayers the empress of Akber became pregnant of a son, who, when born, was called Selim in honour of the saint, and, on ascending the throne, took the name of Jehangeer.

Mathura,[c] thirty miles N.N.W. from Agra, is celebrated as the scene of the birth and early adventures of Krishna. It was destroyed by Mahmood of Ghiznee in 1018. It was afterwards rebuilt and adorned with many rich temples, the most magnificent of which was erected by Raja Beer Singh Deo of Oorcha. This temple was razed by Aurengzebe, who erected a mosque with the materials on the spot. In the fort are still to be seen the remains of an observatory built by Rajah Jeysingh of Jyenagur. After the dissolution of the Mogul government, this place experienced many misfortunes, and, among others, a general massacre of its inhabitants by the orders of Ahmed Shah Abdalli in 1756. At the end of the eighteenth century, it was the head quarters of General Perron, the French commander of the Sindia Mahrattas. It was taken by Lord Lake in 1803. It is a great resort of Hindoo votaries. Here a multitude of sacred monkies of large size are fed by the hand of superstition at the public expense. In 1808, two young English officers having inadvertently fired at one of these revered protegés, were immediately assailed by an overwhelming mob of priests and worshippers, and, in making their escape over the river on an elephant, were drowned. The fish in this part of the Jumna are equally respected, and are said to come to the surface in expectation of being fed.

In the Doab, in the district of Etaweh, is the city of Kanoje,[d] which was a place of great renown, and the capital of a powerful empire at the period of the Mahometan invasion. But it is now completely fallen. The completion of its misfortunes was in 1761, when it was sacked by the Mahrattas. It is now a heap of ruins concealed under rank jungle, a retreat for robbers and criminals of every description. No buildings of any importance remain; the brick walls are going rapidly to decay. Hindoo coins, with the figures of deities, are sometimes found among the rubbish.

Furruckabad, the capital of a district, and the mercantile emporium of the ceded districts of the neighbourhood, contained in 1811 a population of 66,800, which is supposed to be greatly on the increase. Gualior, about seventy miles south from the city of Agra, in this district, is reckoned one of the strongest fortresses in Indostan. It is built on a detached rock 340 feet high, and perpendicular all round; its length is a mile and a half, but its greatest breadth not more than 300 yards. A stone parapet extends all round close to the brow of the hill. Within the summit of this fort, are large natural caves, which contain a never-failing supply of excellent water. The town, placed along the east side of the hill, is large, well inhabited, and contains many good houses of stone, which the neighbouring hills furnish in abundance. This has always been a place of great consequence. Under the Moguls it was used as a state prison, where the obnoxious members of the royal family were confined. It was taken by the Mahometans in 1197 after a long siege, and again by the Afghâns in 1235. In 1519, after having been 100 years in the possession of the Hindoos, it yielded to Ibrahim Lodi, emperor of Delhi. In 1582 it is described by Abul Fazel as the head town of a

[a] Legoux de Flaix, Essai, I. p. 180.

[b] The father-in-law of Jehanghire was named Aiaas. Noor-Jehan, his daughter, was the wife or mistress of Jehanghise. In the original it is simply "that of the father-in-law of Jehan."—P.

[c] Moturapoori.—M. B.

[d] Kanjakodcha, in Sanscrit.—M. B.

district. It afterwards came under the Mahrattas. It is deemed impregnable, yet has often changed masters. In 1780 it was taken by surprise and escalade, by the British troops under Major Popham; the storming party being headed by Capt. Bruce, brother to the celebrated traveller in Abyssinia. It is now in the possession of Dowlet Row Sindia, whose camp, formerly itinerant, was fixed at a short distance south-west from this fortress, where a second city has consequently risen, surpassing the old one in size and population.

Bhurtpoor, thirty-one miles N. by W. from Agra, is the capital of an independent state formed by the Jauts, who originally came from Mooltan, and, though of a low caste, assumed higher claims on adopting military habits. The Bhurtpoor Rajah owes his situation at present to the forbearance of the English, to whom he has more than once proved an unwilling observer of treaties, joining enemies from whom he had no reason to expect greater friendship, or a more respectable independent alliance. He is consequently less powerful than he once was, and pledges of his fidelity, and even testimonies of submission, are now exacted.[a]

Macherry is a Rajah-ship adjoining the province of Delhi. The Rajah has always maintained friendly relations with the British, on whom he is dependent. In 1811, after being for some time in a state of mental derangement, he was seized with an unfortunate propensity to persecute his Mahometan subjects by the most wanton acts of violence and outrage, destroying their tombs, places of worship, and cutting off the noses and ears of the devotees. This religious phrenzy was, however, placed under restraint, and practical toleration re-established by British interposition. Bindroban, or Bendrabad, on the Jumna, is a place containing some old temples, and a tree held in great reverence by the Hindoos.[b] Along the river there are many small chapels inhabited by hermits, and octagonal towers where the pilgrims assemble to bathe. Among the inhabitants are many Beerajes, or Indian monks, and some female vestals:[c] both of them go almost naked, and live in dark straw-roofed cells; they have three yellow stripes on their foreheads.

Ascending the Jumna, we enter the imperial province of Delhi, to the north of Agra and Adjemere, bounded on the west by Adjemere and Lahore; on the north by Lahore and the mountainous countries; and on the east by the same countries, and the province of Oude. Several territories in this province were in 1803 assigned by the British to the support of the decayed representative of the Mogul family, and the revenue is collected under the superintendence of the English resident at Delhi. It has gradually increased, and after supporting the royal household, a surplus remains applicable to general purposes. This province has less natural fertility than Agra, but is better cultivated. It yields three crops of rice in the year. Much of it is still uncultivated, but the places fully subjected to British administration are rapidly improving. It is in contemplation to open a great canal of irrigation, which formerly existed, but has of late years been choked up The districts subject to native chiefs, though also somewhat improved, are comparatively neglected, in consequence of the feuds which prevail among them. The population of this province does not exceed eight millions, consisting of Hindoos, Mahometans, and Seiks, the latter religion being prevalent in the north-west.

The city of Delhi is in Lat. 28° 40′ N. and Long. 77° 5′ E. on the west bank of the river Jumna. It was called Indrapraths[d] prior to the Mahometan invasion, and was even then a city of great fame and magnitude. In the days of its splendour, it occupied an extent of twenty miles;[e] but it had only one street in a line parallel to the river. In 1738 it was sacked by Nadir Shah, and spoiled of its treasures, which were valued at more than ten millions,[f] among which were splendid collections of diamonds, a throne of massive gold studded with precious stones, and statues of elephants in chased gold. The Afghâns and Mahrattas have completed its destruction. Still, according to Legoux de Flaix, it contained in his time more than 1,700,000 inhabitants, but its population is considered by its present masters as only between 150,000 and 200,000. It is divided into two parts, the one inhabited by natives, called Indooanee, the other by Mussulmans, and called Mogolanee; the latter is the most elegant. The finest building contained in it is the imperial palace[g] on the Jumna; it is built of red granite of a tasteful architecture; its length is 1000 yards,[h] and its breadth 600. It is said to have cost 10,500,000 rupees. (L.1,050,000.) The rooms glitter with gilding, azure, and all sorts of ornaments. The stables are capable of holding 10,000 horses. Even the kitchens were like drawing rooms. The Djenana, or palace of the princesses, communicated with that of the emperor by a gallery. On the opposite side of the river was the Selimserey palace, the residence of the brothers and near kin of the emperor, kept in a state of splendid imprisonment. Three other sumptuous palaces are still to be seen in the suburbs, the most remarkable of which is the Godaié Kotelar. The walls of the great saloon, or hall of audience, are covered with crystal, and a lustre of black crystal of admirable workmanship hangs from the ceiling; so that, when lighted up, the whole presents the appearance of a conflagration. Here Legoux tells us, the "peacock throne" was still preserved.[i k] This throne, says that author, is of an oval form, placed under a palm tree which overshadows it with its foliage; a peacock, perched on one of the large palmated leaves, stretches its wings to cover the personage who is seated on the throne. The palm tree and peacock are of gold; so thin and delicate are the feathers and the leaves, that they seem to wave and tremble with the slightest breath of wind. The tail and

[a] In Aug. 1825, the British declared hostilities against Doorjunt Sal, the Rajah of Bhurtpoor, in consequence of a quarrel between him and his brother, Madhoo Singh, who claimed their protection. Bhurtpoor was invested Dec. 10, and taken by storm Jan. 18, 1826, when the war was terminated. *As. Journal.* P.

[b] Tiefenthaler, I. 141.

[c] "Religieuses," nuns.

[d] "Indrabat."—M.-B.

[e] "30 Eng. miles."

[f] "Un milliard," a thousand millions French; more than £40,000,000 The whole amount of plunder is estimated in the Ed. Ency. art. India, at £62,000,000.—P.

[g] "Dauriserai."

[h] "Aunes," ells, each 3.9 English feet nearly.—P.

[i] According to others, it was carried off by Nadir Shah.—M.-B.

[k] See his Essay on Indostan, I. 193.

wings of the peacock glitter with superb emeralds. The fruit of the palm is executed in Golconda diamonds, and is an exact imitation of nature. Modern Delhi contains many good houses, mostly of brick. The observatory is in its vicinity. It was built in the reign of Mahomed Shah, but has been repeatedly plundered. Among the most splendid memorials of the taste and magnificence of Shah Jehan is the well belonging to the Jumna Mojeed or mosque. The water is raised by complicated machinery, and a succession of reservoirs, to the area of the mosque. It becomes an object not only of great convenience, but sometimes of necessity to the whole inhabitants of the city. The consequences of its having gone into disrepair were very distressing during the hot season in 1809, and it was subsequently put in order at the expense of the British government. Such is the veneration with which, from political habit, the city of Delhi is viewed, that many of the native princes still attach to it the idea of being the capital of their supreme government. The coin is in some places struck in the name of the Mogul emperor. Some have applied to the present representative of the family for confirmation in their respective possessions; an empty ceremony, which the British policy does not encourage, whilst others apply for favour and acknowledgment to the British power, chiefly in consideration of their now having possession of the Mogul metropolis.[a]

Nine miles south-west from Delhi there is a remarkably elegant pillar 242 feet high, which seems to have been intended as a minaret to a mosque which was never built: it goes under the name of Cuttub Minar.

Rewary, fifty miles S. W. from Delhi, is a town, with a district of the same name, formerly given to the Rajah of Bhurtpoor, but resumed by the British on account of his infidelity to his engagements in their cause. It is now a secure and considerable entrepôt for the commerce carried on with Delhi in that direction, which is great and constant.

Paniput, fifty miles N. by W. from Delhi, was formerly a great commercial emporium, but has suffered severely from the political confusion which so long desolated the country. It is famous as the scene of two of the greatest battles ever fought in India; one in 1525, between the Sultan Bauber and Ibrahim Lodi, the Afghân emperor of Delhi, in which the latter was defeated and slain, in consequence of which the dynasty of Timur seized the throne; the second took place in 1761, between Ahmed Shah Abdalli, king of the Afghâns, and the Mahrattas, under the Bhow Sidasiva. The latter were routed with immense slaughter; 40,000 prisoners were taken; out of 500,000 persons, including men, women, and children, who composed the Mahratta camp, the greater part were killed: many were deliberately put to death in cold blood by the Afghâns; and many who attempted to escape were slain by the neighbouring Zemindars.

That part of the province of Delhi which lies to the east of the Ganges is called Rohilcund, being formerly possessed by a race called Rohillas,[b] originally of the Yoosofzey Afghân tribe, who migrated hither about the beginning of the eighteenth century. They are a handsome and tall race, of a whiter complexion than the more southerly inhabitants of India, courageous and hardy, and conjoin the pursuits of agriculture with those of arms. They were united under a distinct leader. In 1774 the British defeated their combined forces at the battle of Cutterah. They have been since that time exposed to the plundering incursions of the Seiks, and the rapacity of the Nabob of Oude, who also denies the Rohillas the advantage of commercial intercourse with his territories, which is enjoyed by the other British districts; but their industry puts them in possession of a considerable trade. Rohilcund includes the three separate jurisdictions of Bareilly, Shah-jehanpoor, and Moradabad. The Mahometans and Hindoos are about equal in number; but, owing to the intolerance of the former, there are no Hindoo temples of any magnitude. The population, especially about the town of Bareilly, is considerable, but has never been numerically ascertained. Bareilly is a large and thriving place, situated on the banks of the united Jooah and Lunkra. It was the capital of Hafez Rehmut, a Rohilla chief, slain at the battle of Cutterah, who lies interred here.—Cutterah is twenty-eight miles S. E. from Bareilly.—Moradabad forms the western part of Rohilcund. The soil is naturally moist: it is rich, but not cultivated. The climate is unhealthy, a circumstance attributed to the vicinity of the mountains; and the population is scanty. During the Patan sway, this part, as well as the rest of Rohilcund, was in a highly flourishing condition; its decline may be dated from the Mahratta invasion. It has been a prey to Jauts, Mewatties, Aheers, and others; and even still the police is far from being efficient for the prevention of gross enormities. The imprisonments, trials, and punishments, which take place on account of robbery and murder, are uncommonly numerous. The independent jaghire of Rampoor, possessed by a Rohilla Nabob, affords refuge to plunderers from the pursuit of justice. In 1816, the number of prisoners at Moradabad was upwards of four hundred.

About 90 miles due north from the city of Delhi is Saharunpoor, the capital of a British district of the same name. This district, though situated between the Jumna and the Ganges, and in itself flat, is not subject to the periodical inundations which prevail in Bengal.

In this district is Hurdwar, a celebrated place of Hindoo pilgrimage, near the last of the falls of the Ganges, where the pilgrims come to bathe in the river. At the end of March they begin to assemble. In 1794 there were 150,000. Every ten years the number is unusually great. This gregarious pilgrimage is accompanied by an annual fair, at which a great multitude of mercantile transactions take place. In times of political uncertainty and confusion, serious affrays have occurred from the rival claims advanced by different armed castes to the superiority and direction. The British ascendancy has been followed by the establishment of more steady regulations for conducting the ceremonies and the trade. The town of Hurdwar is very small, having only one street, which is about a furlong and a half in length. About forty-seven miles N.N.E. from

[a] Elphinstone.

[b] Roh, mountaineer, in Afghân.—M.-B

Delhi is Seerdhuna, the chief town of Somroo Begum, the widow of a celebrated military adventurer, called Somroo, who was a native of Treves, and died in 1776.

In the west part of the province lies Hurriana, the chief town of which, Hissar, has extensive ruins, having been once a flourishing capital. The palace of Feroze Shah, in the centre, has some extensive subterranean apartments. The surrounding territory was long a prey to all sorts of irregularity and individual rapacity, the British leaving it to different chiefs, and declining to receive marks of subjection from any, for fear of becoming involved in their disputes with their neighbours: but matters were carried to such a height among the predatory natives and neighbours, that the chiefs resigned their possessions, and the British took them into their own hands. This happened about 1809.

The northern quarter of the province of Delhi is occupied by Seik principalities under British protection. Here is the ancient town of Thanusar, in the vicinity of which is the lake Khoorket, to which pilgrims come from great distances to worship and bestow their charity. Sirhind, once a renowned and brilliant city, is now a scene of desolation, from the devastations of the Seiks, who, in 1707, destroyed the mosques, and levelled the palaces and public buildings with the ground. D'Anville makes this the *Serinda* from which Justinian procured silk-worms, an opinion not admitted by other oriental scholars.

On the south-east of Delhi is the province of Oude,[a] the smallest in Upper Indostan. On the north it is bounded by some dependencies of Nepâl; on the south by Allahabad; on the east by Bahar; and on the west by Agra and Delhi. Its length is 250 miles; its breadth 100. The whole surface is level, well watered, and productive in various valuable plants. It also produces nitre, kitchen salt, and *lapis lazuli*, from which last is obtained the ultra-marine blue so much valued by painters, and which sells at nine guineas per ounce. The Hindoo inhabitants of this and the adjoining provinces are a much superior race, both in bodily and mental qualities, to those of the southern parts, though the latter may be their equals in acuteness and cunning. The Rajepoots, or military class, have robust frames, and are taller in stature than the Europeans. Many of them are Mahometans. From this province some of the East India Company's best sepoys are procured. Their military habits were kept much on the alert by the political anarchy of the province, till the British government assumed the superintendence. The present capital of Oude is Lucknow, on the south side of the river Goomty, one of the tributaries of the Ganges which descends from the Kumaoon mountains. The streets inhabited by the lower classes are sunk several feet below the surface. They are extremely dirty, and so narrow that two carts cannot pass each other. The Nabob's palace, the mosques, and burying places, display considerable splendour, having gilt roofs and an ornamented architecture. The Imâm Barri, built by Asoph ud Dowla in 1783, is reckoned one of the most superb edifices in India, with the exception of those erected by the emperor of Delhi. Here is the sepulchre of that Nabob, where tapers are kept burning, and verses from the Koran continually chaunted, both day and night. In the neighbourhood is Constantia, the residence of the late General Claude Martin, to which are attached a superb garden and a mango clump, but the surrounding country is flat and barren. On the General's decease the furniture was sold, and the mirrors and girandoles now adorn the government-house at Calcutta.

The town of Oude, on the south side of the river Gogra, is religiously honoured as the ancient capital of the great Rama, but now exhibits a shapeless heap of ruins, covered with jungle, and containing the reputed sites of temples dedicated to different sainted characters. The pilgrims who resort hither are chiefly of the Ramata sect. Fyzabad, which was the capital before 1775, still contains a numerous population. It has been chiefly remarkable of late years as the residence of the celebrated Bhow Begum, widow of Shuja ud Dowlah, who died in 1815, and left a treasure amounting to L.1,038,074 sterling, exclusive of jewels, shawl goods, wearing apparel, cattle, and various other property. Between the river Gogra and the southmost range of the Himâlah chain of mountains, is Gorukpoor, a large but depopulated town, not far from the mausoleum of Goseknath, a famous Hindoo hermit, and founder of the sect of Jaghys;—Balrampoor, much frequented by the merchants from the northern mountains, who bring hither the tails of yaks and strong horses of a small breed;—Naudpara, on a marshy soil covered with bamboos, and inhabited by wild long-horned buffaloes;—Nimkar, on the Goomty, where a sacred table, a tree, and some pools, attract the veneration of the Hindoos;—and Khyrabad, which contains a considerable manufacture of cotton stuffs. In the district belonging to it is a sacred place called Brahmavert, where Brahma sacrificed by the side of a brackish pool.

On the south of Agra and of Oude lies the province of Allahabad. It is bounded on the south by the Hindoo province of Gundwana, on the west by Malwah, and on the east by Bahar. The surface of this province on the banks of the Jumna and Ganges is flat and highly productive, but the south-west parts, called Bundelcund, consist of an elevated table land, diversified with high hills, and abounding with fastnesses.[b] It is not susceptible of complete cultivation, but it contains the famous diamond mines of Pannah. The low part has a sultry climate, and is exposed to hot winds, from which Bundelcund is exempt. Besides the two great rivers, a number of small streams flow through the north part of this province, and render some districts, especially the subdivisions of Benares and Allahabad, among the most productive countries of India. It exports diamonds, nitre, opium, sugar, and indigo. The hilly country, having fewer and smaller rivers, depends chiefly on the periodical rains, and the water procured with considerable labour from wells. The population exceeds seven millions, consisting of a proportion of Hin-

[a] Ajodhja, Sanscrit.—M.-B.

[b] Bundelkund is situated between 24° 3′ and 26° 26′ N. and between 77° 48′ and 81° 33′ E. It is 232 miles long by 165 broad. It has a population of 2,400,000, of which 700,000 are British subjects; the rest are governed by small rajahs, under British protection.—*Asiat. Journal.*—P.

doos to Mahometans as eight to one. In the remote antiquities of India, it held a high rank for containing the two chief prayagas or confluences of the Ganges, places always esteemed peculiarly sacred in the Brahminical religion. It is at present entirely subject to British jurisdiction, with the exception of some petty chiefdoms in Bundelcund. The city of Allahabad is considered by some orientalists as the ancient *Palibothra*, the capital of the Prasian or Pragian monarchy.[a] It is called by the Hindoos the "Prayaga" by way of distinction, being the most sacred place of this description. Here the Ganges, the Jumna, and the Sereswati, are said to join; the last, however, is not now visible, and is only asserted to flow under ground![b] By bathing at the place of junction, a condensation of religious purification is obtained, amounting to the same degree as if the votary had bathed in each of the three separately, and even acquiring from the junction an additional consummation of spiritual privileges. When the pilgrim arrives, he sits down on the bank of the river, has his head shaved, allowing all his hair to drop off directly into the water, the sacred writings promising a million of years' residence in heaven for each hair thus disposed of. Next day he performs the obsequies of his deceased ancestors. Each devotee pays a tax of three rupees to government, and expends much more in charity to the Brahmins, who wait by the river side to receive these pious oblations. Many sacrifice their lives at the exact place of confluence, by going out in a boat and plunging in with weights hung to their sides. Others lose their lives by the pressing of the crowds, eager to enter the most sacred spot of the river at periods of the moon esteemed supereminently holy. The fort of Allahabad is situated on a tongue of land a quarter of a mile from the city, the one side being washed by the Jumna, and the other approaching to the Ganges. It is lofty and extensive, and commands the navigation of both rivers. The side next the land is regular and very strong; the gateway elegant, and in the Grecian taste. The government house is spacious and cool. The fortifications are considered as now quite impregnable to the tactics of a native army. This was a favourite city of Akber, and by that emperor the modern city was founded. The houses were formerly built of brick and substantial, but now mostly of mud. The inhabitants, exclusive of the garrison, are estimated at 20,000.

Another place of distinguished interest in India is the city of Benares in this province, being both a place of great sanctity and the focus of Brahminical erudition. The streets of Benares are so extremely narrow that it is difficult to get along even on horseback. The number of stone and brick houses is upwards of 12,800. Some of the brick houses are six stories high, with terraces and small windows. Those on the opposite sides of the streets are often connected by crossing galleries. The mud houses are above 16,000 in number, and in 1803, the permanent inhabitants exceeded 582,000, exclusive of 8000 foreigners. During festivals the concourse is beyond calculation. The Mahometans are supposed to be more than one in ten. About 8000 houses are occupied by mendicant though not needy Brahmins. The mosque was built by Aurengzebe in a conspicuous and sacred spot, where a Hindoo temple formerly stood, which was destroyed to make room for the mosque. The houses of the English at Serole are handsome, but, like others in this climate, look bare for want of trees, which cannot be suffered near any dwelling on account of the multitude of musquitoes which they harbour. Benares contains many inhabitants of great opulence, and many active merchants and bankers. It is the great mart for diamonds and other precious stones, brought principally from Bundelcund. The land in the vicinity is high priced, and property frequently litigated. Benares is held sacred for ten miles round. The famous lingam which it contains is reckoned a petrifaction of Siva himself. Within the city are not less than a million of images of the lingam. The history of this city is rich in the marvellous. It is believed that it was originally built of gold, but in consequence of the sins of the people was converted into stone, and afterwards into clay and thatch for their increasing wickedness. The Brahmins maintain that the physical foundation of this city differs from that of the rest of the terrestrial mass. It rests on the point of Siva's trident! while the earth rests on the thousand-headed serpent Ananta, (the emblem of eternity.) Hence no earthquake is ever felt within its holy limits, and it retained its position at epochs at which the rest of the world was overthrown. One visit to Benares secures for the pilgrim a happy entrance into the heaven of Siva. There are persons who practise the profession of regular guides or cicerones to the pilgrims. Many resort hither to finish their days, and such is its sanctity, that even the English, who have stained their souls with the blood of the cow, and sacrilegiously fed on her flesh, may obtain absorption into Brihm by dying at Benares. Let it be hoped that this privilege does not depend on the faith which the privileged individual reposes in the reality of the bliss which awaits him, a condition which would be somewhat unreasonable.—Benares is also the Athens of the Hindoos. In 1801, besides the public college for Hindoo literature, there were private teachers of the Hindoo and Mahometan law. Of the former 300 were said to be eminent: their pupils were 5000. No fees are taken from the pupils, the teachers being supported by donations from pilgrims of rank, and regular salaries from Hindoo princes. Reading and writing are taught together, the boys being made to learn the forms of the letters by tracing them on a surface of loose sand. The Brahmins are seen teaching literature and science in the streets, and under the trees. The ancient name of Benares was Casi, or "the splendid," which it still retains.[c] Since 1781, when it came into the hands of the English, it has enjoyed uninterrupted tranquillity, and has increased in

[a] "The most recent researches have rendered it probable that Palibothra was situated 425 Roman miles E. of Allahabad, near the ancient confluence of the Ganges and Cosi."—M.-B.—P.

[b] "The last is only a spring, which soon disappears, but which is consecrated to Saraswati, the wife of Brahma, and the Hindoo Minerva."—M.-B.—P.

[c] Casi or *Kaschi* was the most ancient name: its more recent name in Sanscrit, is *Vanarasi*, from *vana*, solitude, and *rajah*, royal prince, from the great number of Hindoo hermits, who have made it their resort from time immemorial.—M.-B.

all directions. Its population certainly exceeds 600,000. It has fine gardens, elegant tanks, and pagodas ancient and modern, among which is the temple of Visvisha, built of red stone, and ornamented with elegant columns and fine sculpture. It contains a stone statue of a bull, and a living bull is always kept in it, as in the temple of Apis in Egypt. The pagoda is consecrated to Mahadeo, or Siva, who is worshipped under the symbol of a black stone, a common emblem of divinity among the ancient nations, and which some consider as connected with the history of stones which have fallen from the atmosphere.[a] The observatory, built by the Rajah Jessing, still stands. Its figure is spherical, representing the universe. In its interior are contained the zodiac, and other circles of the armillary sphere. The astronomical system here delineated is the Copernican, which is believed to have been known and adopted by the ancient Indians. The instruments for observation are partly made of stone.[b]

In the district of Rewah, the English have, as in other places, put down the trade of gang robbery, by which the country was previously so unmercifully oppressed. Surnaid Singh, a leader of a den of thieves, finding he could not escape when the mud fort of Entoorree was stormed, and the garrison put to the sword, strewed gunpowder on a cloth, in which he wrapped himself up, and then terminated his life by setting it on fire.

The diamond mines of Pannah are supposed to have been the *Panassa* of Ptolemy. During the reign of Akber they were supposed to yield eight lacks of rupees per annum; and, under the government of the native chiefs and of the Mahrattas, these mines have been a considerable source of public revenue, as well as of mercantile profit. The diamonds are contained in the loose soil which is mixed with pebbles. The soil is washed, and the pebbles separated with the hand on a board. The diamonds are always found loose and separate. Many days are spent unsuccessfully in this labour, but a very few diamonds in the course of the year repay the workmen. They are taken to a house, weighed, and sold to the merchants residing at Pannah. The workmen are allowed a certain proportion of their value. Chatterpoor is a trading town, but full of temples, and inhabited partly by beerajes, or Indian monks, fakeers, and other devotees. It was an important entrepôt for the trade between Mirzapoor and the Deccan. It is extensive and well built, but far from being so flourishing as in former times.

The large province of Bahar is situated between Bengal on the east, and Oude and Allahabad on the west. On the north it is bounded by the territory of Nepâl, and on the south by Gundwana, which also extends round part of its western frontier. Its surface is flat, the soil fertile, and the climate highly favourable to vegetation. Agriculture, manufactures, and commerce, have always greatly flourished in this province. Opium is its staple commodity, of which the government makes a monopoly. It is brought to Calcutta, and exposed to public sale. Nitre is also manufactured. The modern capital is Patna, about a mile and a half long, and three fourths of a mile broad within the walls. It is closely built, and the suburbs are extensive, so that altogether it occupies nine miles along the river side, (including Jaffier Khan's garden,) and its width averages two miles. It contains but few European houses and settlers. The walls and gates are in a decayed and tottering state. In the middle of the city the Romish Christians, consisting of twenty Portuguese families, have a church, the handsomest in the place. Near to it is the common grave of the English, who were treacherously massacred by Meer Cossim in 1763, before his final overthrow. That massacre was perpetrated by the adventurer Somroo or Summers. This place now ranks before Delhi and Agra: its population is 312,000 of stationary inhabitants; of whom 97,000 are Mahometans, and 214,500 Hindoos. The Seiks have here a place of worship of great repute,[c] and several families of Armenians have long had a fixed residence here. Gaya, the capital of the Bahar district, is a place of great sanctity, being the scene of many Brahminical legends. It is the resort of numerous pilgrims. These poor creatures have laboured under gross oppression and extortion from the priests, being even subjected to torture till they consented to give an offering deemed suited to their circumstances. The British have prohibited all forced exactions, and made the priests amenable to the criminal police for any acts of violence, or for refusing to perform the ceremonies required when the pilgrim makes his voluntary gift. In times of peace the number of pilgrims and their attendants is reckoned not less than 100,000. Many breaches of the peace arise out of this great concourse, and the priests have a character for ignorance and immorality ill fitted for disseminating any improvement in morals among those who aspire at the benefit of their intercourse. Some miles from Gaya there is a granite rock in which a great cavern, and some temples containing Indian inscriptions, have been formed.[d]

The district of Boglipoor, in the eastern part of this province, consists of a great variety of surface; hills, rocks, woods, and thickets. Some iron ore is found in it. The inhabitants bear a much superior character to that of the south-eastern natives of Bengal; but it contains among the mountains a barbarian population of extremely predatory habits, who mostly follow a superstition of their own, while some of the wealthiest have fallen under the influence of a low caste of Brahmins, who have instructed them to worship Durga, and say prayers before a beel tree. Both sexes of these mountaineers are addicted to intoxication. They pay no taxes. Some of the chiefs receive pensions from the British government for maintaining the public peace. These are generally spent in liquor at the town of Boglipoor. The town is chiefly inhabited by Mahometans, who have a college here in a state of great decay.

Monghir is a celebrated town and fortress, beautifully situated on a bend of the Ganges. It was a place of great importance under the Mogul government. It was strengthened by Cossim Ali, when he intended to throw off his dependence on the English, who had raised him to the throne, but was taken in nine days. It was a place of importance, a station for a brigade, and a

[a] Dalberg, sur le culte meteorique.
[b] Esquisses de l'Histoire des Indes, Trad. de l'Angl. II. p. 24.
[c] And a college.—M. B.
[d] Asiat. Researches, vol. I. p. 300.

depôt of ammunition; but, since the British dominions have extended beyond Delhi, Allahabad has been chosen for a depôt, and the fort of Aonghir has been neglected. The population is about 30,000. The most respected place of worship here is the monument of Peer Shah Hossein Lohauni, where both Hindoos and Mahometans make frequent offerings, especially on their marriages, and other interesting occasions. The gardeners, tailors, and carpenters of Honghir, are noted for their expertness. Much of the army clothing is made here, and they excel in making European furniture, carriages, and palanquins. Hardware also, though coarse, is extremely cheap. About four miles from Monghir there is a hot spring called Seetacoond, of a temperature of 130° or upwards. Not far from Monghir the Afghâns built a rampart which formed a connection between two mountain chains, to protect the country from hostile invasions.

Proceeding down the Ganges, we come to the most important province in India, occupying the lower part of the course of that great river. This is Bengal,—a province more deserving of the appellation of a kingdom than any to which we have yet turned our attention, and which will merit a minute description.

Bengal enjoys a position admirably adapted for security against the attacks of foreign enemies. The whole northern frontier is skirted with a belt of low land, from ten to twenty miles broad, covered with a most exuberant and impenetrable vegetation, particularly the augeah grass, which is sometimes thirty feet in height, and two inches thick. Beyond this, are the mountains connected with the Himâlah, the population of which, though warlike, is thin and of limited number. On the south, the shore is almost inaccessible by sea, on account of the shallows with which it is everywhere beset, having only one harbour, and that difficult of access. On the east it is protected by rugged mountains and mighty rivers from any inroads on the side of the Birman empire. It is only on the west that the approach of an enemy could be apprehended, and here also the natural barrier is in most places strong.—The Ganges, running in a south-easterly direction, divides Bengal into two nearly equal portions. Taken in general, it is a flat country, containing only a few elevated tracts. The parts liable to annual inundations were called *Beng*, whence probably the name which we give to the whole province. The higher lying parts were called *Barendra*. In the southern districts rice grows most luxuriantly; as we ascend the river, the proportion of wheat and barley progressively increases.—The most important productions of Bengal are tobacco, indigo, cotton, the mulberry, and the poppy, each of which, in general, requires land appropriate to its own cultivation. One great object of the farmer is to have an equal supply of water, which is frequently obtained by means of embankments crossing the country, and preventing the rain which falls from flowing off. Much care is requisite to protect the seed, when sown, from the depredations of numerous birds, and afterwards in several districts the produce must be protected by watching from the incursions of wild boars, elephants, buffaloes, and deer. Maize and millet require protection during the night from the large bats. The grain is stored in jars of unbaked earth, or in baskets made of large twigs. The implements of husbandry are coarse and ill adapted to their office, the plough merely scratching the surface, without turning it up. A number of them in succession, each drawn by a single yoke of very small oxen, are employed to deepen the furrows. The miscellaneous exercise of different kinds of industry is numbered among the causes which retard the progress of agriculture. The Bengalese can readily turn from his usual occupation to another branch of the same art, or to an entirely new occupation, and succeeds surprisingly in his earliest efforts. The division of labour is prevented from being carried to any extent by the want of capital. Every manufacturer and artisan works on his own account, and conducts the whole process of his art, from the formation of his tools to the sale of his produce. This versatility is certainly a valuable resource in those cases in which the demand for any class of productions ceases,—a frequent cause of misery in manufacturing countries, from the helplessness of individuals who are thrown out of their usual employment, and unfit for any other. Many of the farm servants in Bengal are purchased slaves, or bond-servants, but they are not treated with any harshness, or even distance, by their masters. The culture of potatoes has been introduced here with very beneficial effect. A great abundance of fish is supplied by the rivers; the best and highest flavoured of which is the mango fish, so called from appearing during the mango season. Mullet abounds in all the rivers, and may be killed with small shot, as they swim against the stream, with their heads partly out of the water. Bengal enjoys great facilities of internal commerce; innumerable boats incessantly navigate the Ganges, its tributaries, and its branches. The construction of these vessels varies in a curious manner with the kind of navigation to which they are destined. The flat clinker boats used in the western districts are different from those employed in the wide and stormy navigation of the lower Ganges. The latter are lofty, unwieldy, and deep. All the Bengalese boats are without keels, which would render them unsafe, as they often ground in the shallows. For this reason they are not so well adapted for sailing. In descending the river they are carried before the stream; in ascending, they are dragged along with the track rope; in the winding branches at the mouths of the Ganges, the principal reliance is on the oar. The original manner of conducting commerce seems to have been by hauts or open fairs, held on particular days, in an open plain. These are still very frequent. Petty traders take advantage of the days kept as festivals of the Hindoo gods and Mahometan saints, to find a market for their wares. Many places have bazars, or daily markets, in which articles in common use are regularly sold. These are kept by established shopkeepers, and frequented by small venders. There is no uniformity of weights and measures. They have standards, but these are local, very numerous, and different even in the same place for different articles of merchandise. The currency is silver and cowries. Copper has never been introduced, and gold seldom appears, except in Calcutta. Bankers were introduced from the west, at the time of the Mahometan conquest. Previously, they were few in number, and of low rank.

At all the markets there are money changers, with loads of cowries, who, in the early part of the day, give cowries for rupees, and in the evening give the hucksters rupees for their cowries, as being more easily transported. Their profit on the two transactions is about a thirty-sixth part. The same class are also in the habit of advancing money to improvident servants, on their monthly wages, charging a profit of four seventy-fourths per month, on their advances, but occasionally losing their principal.

This province contains the now celebrated city of Calcutta, the metropolis of the British power in India. It is situated about 100 miles from the sea, on the east side of the western branch of the Ganges, called the Hoogly, or Calcutta river. It is rendered somewhat unhealthy by being in the vicinity of extensive muddy lakes, and an immense forest. The jungle has been cleared away to a certain extent; broad straight roads are cut in the direction of the prevailing winds, and the streets are well drained; but the air of the place still participates in the disadvantages belonging to its general situation. At high water, the river is a mile in breadth, and at ebb tide exposes a great extent of dry sand banks. On approaching this city from the sea, a stranger is much struck with its magnificent appearance; the spires of the churches, temples, and mosques, the strong and regular citadel of Fort William, the extent of the buildings, the expansion of adjoining villas and gardens, present a picture very different from the state of the same locality a hundred years ago, when it was a mere village, inhabited chiefly by husbandmen. It extends above six miles along the river. The esplanade between the citadel and the town leaves a spacious opening, in which stands the new government-house, erected by the Marquis Wellesley; and on a line with this edifice is a range of magnificent houses, ornamented with spacious verandahs. The architecture of the houses is Grecian, and the pillars of the verandahs too elevated to afford the requisite shade in this hot climate, in the mornings and evenings. One of the most memorable objects is the Black Hole, the prison in which Soobah Sarajeh ud Dowla, on taking the fort in 1756, shut up the garrison, consisting of 146 persons, of whom 123 perished miserably before morning, suffocated by the confined air. It now forms part of a warehouse, and is filled with merchandise. A monument of a pyramidal form is erected opposite the gate, to commemorate the unfortunate persons who perished by this act of cruelty. It has suffered by lightning, and is rather in a decayed state. The government-house is the most remarkable public edifice. The others are, the town house, the court of justice, and two English churches. It contains a Greek church, an Armenian, and some Romish churches belonging to the Portuguese, many Hindoo temples, and Mahometan mosques. The botanic garden is beautifully situated on the west bank of the river, on a bend of the Hoogly, hence called the Garden Reach. That part of the town which is inhabited by natives, and called the black town, extends to the north of the other, to which it exhibits a wretched contrast. Its streets are narrow, dirty, and unpaved. It contains some two-storied houses of brick, but the great majority are mud hovels roofed with small tiles, with side walls of mats, bamboos, and other combustible materials. Hence conflagrations are frequent. The English houses are all detached, each possessing a piece of ground surrounded by a high wall. They cost large sums of money, and stand in constant need of repair. The destructive ravages committed on the timber by the white ants often occasion complete ruin in the interior, while the house has on the outside every appearance of being perfectly sound. Fort William stands about a quarter of a mile below the town. It is of an octagonal form, and superior in strength and regularity to any fortress in India. The building of it was commenced by Lord Clive, after the battle of Plassey. It has cost the East India Company altogether two millions sterling. It is too extensive to be useful as a tenable post in a case of extremity; requiring 10,000 men to defend its works, and containing 15,000, a number which would be able to keep the field. The works are scarcely above the level of the country,—a circumstance which excites surprise in the natives the first time they see it, as they connect the idea of strength with elevation; they generally mistake the barracks for the fort. The strata under the soil in this neighbourhood, are of a clayey tenacious texture, and on boring to a depth of 140 feet, afford no springs. At a depth of thirty-five, a stratum of decayed wood is found, the debris, no doubt, of some ancient forest. The population of Calcutta is computed at half a million. In 1798, the number of houses, shops, and other habitations in the town, belonging to individuals, was as follows:—

To natives of Great Britain	4,300
Armenians	640
Portuguese, and other Christians	2,650
Hindoos	56,460
Mahometans	14,700
Chinese	10
Total houses, independently of those belonging to the Fort and the Company	78,760

The genteel society of Calcutta is highly convivial. It is customary to rise early. Dinner is generally after sunset, and the convivial parties are kept up till midnight. The provisions are excellent, and liberally served; and as they quickly spoil in this climate, the remains are thrown out to the pariah dogs: the prejudices of the natives not allowing them to use any thing prepared by persons not belonging to their own caste or religion. The lower orders of the Portuguese cannot consume the whole, and they are cleared away by a variety of animals, chiefly the pariah or wandering dogs, and immense flocks of crows, kites, and vultures, which almost cover the houses and gardens. The adjutant stork tenders his assistance during the day, the jackals and foxes mingle with the pariah dogs during the night, and altogether keep up a hideous howling. Game is to be had in great abundance. Madeira and claret wines are used. They are exposed to much damage from the musk-rat, that animal communicating to every bottle which it passes over a disagreeable flavour, which renders it unfit for use. The tables are covered with a profusion of delicious fruit, obtained at a very moderate expense. The usual mode of visiting is in palanquins, but many gentlemen have carriages on a construction suited to the climate; and the breed of horses has been greatly improved. The British inhabitants are hospit-

able and generous to their countrymen in cases in which their assistance is required. The Asiatic Society, established in this city by Sir W. Jones, has proved highly useful for concentrating such knowledge as is occasionally obtained of Asia, and particularly of Indostan. Many British merchants here have attained great opulence, and live in a splendid style. The Armenians are very respectable, and form the most numerous body of foreign merchants. Some of the higher classes of them are usually invited to the public entertainments of the English. The Portuguese houses of agency are, next to the English, the most numerous. Many of the Portuguese approach very near to the natives in appearance and manners. Some Hindoo traders have acquired enormous fortunes. Some of them have apartments fitted up in the European fashion, and in the most splendid style, while other rooms in their houses contain the images of their deities, decorated with jewels. Some of them keep English coaches and equipages. There is more intercourse between the Europeans and the natives in Calcutta than in other parts of India. The lower orders of Europeans have acquired a Hindoo appearance, and the Hindoos in too many instances contract from the most worthless of the Europeans a brutality and coarseness of character, habits of drunkenness, and other moral deformities. The business of the courts of justice also, with all its blessed fruits, generates in numerous individuals a spirit of low chicane. Dishonesty is extremely prevalent, yet the property of Europeans is respected in a surprising degree by the natives, even when exposed to great temptations.

Chandernagore is a French settlement on the west bank of the river Hoogly, sixteen miles from Calcutta. The position of this town is preferable to that of Calcutta. The population of it in 1814 was 41,377, and the revenue which it yielded 32,154 rupees. The Dutch settlement of Chinsura is eighteen miles up the river from Calcutta, on the west side. It was first the seat of a Dutch factory in 1656. The Danish settlement of Serampore, twelve miles above Calcutta, has a lively and pleasing appearance, the houses being well built, and whitened with chunam. It is narrow and long, extending about a mile along the banks. It has a small saluting battery, but no fortifications. It is the head quarters of the European Protestant missionaries, and has become a place of great literary activity; the proficiency attained in the eastern languages in this place being very extensive.

The dreary regions at the mouths of the Ganges, called the Sunderbunds, consist of a labyrinth of rivers and salt creeks, forming a complete inland navigation. All the banks consist of alternate strata of sand and black mould, bearing the appearance of recent deposition, and showing the shifting nature of the streams, and the mutability of these numerous islands. The navigation to Calcutta is by two passages, more than 200 miles through a thick forest, where at one time the channel is so narrow that the branches of the trees on the opposite shores meet over the vessel, while at another it presents a spacious expanse of water, and distant shores finely fringed with wood. The only inhabitants of the forests are wild beasts, excepting here and there a solitary fakeer, or Mahometan devotee,—persons greatly respected, and supposed to be divinely protected from the prowling tigers. Wood-cutters also frequent these places. The marshy parts of the forests do not admit of cultivation. Some of the drier parts might undoubtedly be cultivated; but the impenetrable forest is valued as a strong natural bulwark against maritime invasion. Large quantities of excellent salt are manufactured in this quarter, and the article is esteemed particularly sacred, as being obtained from the mud of the Ganges. The forests also furnish Calcutta with an inexhaustible supply of wood for fuel, and other purposes. This vast tract is considered as without owners, and therefore claimed as the property of government.

Sagor Island is twenty miles long and five broad The anchorage is healthier at this part than higher up the river. It is a celebrated scene of Hindoo pilgrimage, being esteemed a place of great sanctity, because it is situated at the junction of the holiest branch of the Ganges with the ocean. Here many aged persons make a voluntary sacrifice of their lives. Children also are sacrificed, by being thrown into the water, particularly by people belonging to the eastern districts, who sometimes, when apprehensive of not having progeny, promise, that if they have five, the fifth shall be devoted in its infancy to the Ganges. Similar immolations take place at Allahabad, at Bânsbariah in the district of Hoogly, and at Chogdah in that of Nuddea. The sacrifices of the aged are sanctioned by express tenets in their sacred books; but the sacrifices of children are not any where enjoined; such acts are the offspring of spontaneous superstition, binding itself by voluntary vows. In 1801, this dreary island was only inhabited by a few of the devotees called Gosseins, who claimed contributions from the pilgrims and itinerant merchants who resorted to it. Obsequies are performed for deceased ancestors, and an ancient sage called Capila, who is said to have lived 2000 years before Christ, has a temple here, in which he is worshipped as a god. Religious mendicants sometimes take up their abode at the temple, and are often devoured by tigers. Ruins of embankments and works of masonry are found here, which show that the island has at one time been inhabited. Of late years, the attention of government has been directed to this island, and it has been let out in portions to an association consisting of Europeans conjoined with natives. In this instance, the government has relaxed from that rigid policy which it has on other occasions invariably observed, of prohibiting Europeans from becoming landholders. This was necessary that the undertaking might be conducted with the requisite vigour, as the speedy clearing of the island of the shelter in which the tigers lurk, is necessary to make it habitable. In April, 1819, one fifth was already cleared, and a broad passage effected through the remainder, in consequence of which the tigers gradually retired. In the course of these proceedings, several vestiges of old buildings were discovered.

An island two miles long, and half a mile broad, called Edmonstone's Island, in lat. 21° 5′ N. and long. 88° 20′ E. has emerged from the water since the year 1813. It is covered with the trunks of trees floated down the river, many of which have taken root and vegetated,

while creeping plants have bound together the accumulated sand, pushing upwards to the surface, in proportion as fresh portions were either deposited from the water or drifted by the wind; the dung of the birds by which the place is frequented has promoted vegetation, and contributed to the formation of a fertile mould. The chief creeping plant of this description is the *Ipomea pes capræ*. Some species of *salsola* likewise contribute to the same end. It is visited by wood-cutters and fishermen, who erect huts on it, but no permanent habitation has as yet been established.

The district of Bachergunge is at the mouth of the Puddah, or great stream of the Ganges, on the sea shore, east of the Sunderbunds, and similar in physical character, only that it is cultivated and populous. In 1584 it was laid waste by an inundation, and afterwards by the ravages of the Mughs, a ferocious banditti, who live on the eastern frontier of the province, and who were aided by the Portuguese settlers in Chittagong. The district of Jessore, on the coast of Calcutta, partly consists of a similar territory; it has been infested by river pirates, who live in the jungles. These places also are inhabited or frequented by salt-makers. This territory has been somewhat better cultivated since the land was settled on the Zemindars as their property, in fee-simple. The rent which they realise amounts to about a fifth part of the government land tax. It contains 1,200,000 inhabitants, in the proportion of nine Mahometans to seven Hindoos. The district of Hoogly also improves, but much of it continues in a state of nature. It is particularly annoyed by gang-robbers, who accompany their robberies with torture. This crime, though somewhat diminished by the vigilance of the British police, is still extremely prevalent. The river Hoogly, from which the district derives its name, is formed by the junction of two branches given off by the Ganges, called the Cossimbazar, and the Jellinghy. The influx of the tide here is sometimes inconceivably rapid, occasioning, at Calcutta, an instantaneous rise of five feet. On its approach all boats must quit the shore, their place of safety being the deep water in the middle of the river. The town of Hoogly is large, well inhabited, and thriving, but not equal to what it was under the Mogul government, when all the duties on foreign commerce were collected there. In 1632, it was the scene of a tragical slaughter of the Portuguese, when the Moguls took it by assault. Most of the Portuguese ships lying at anchor were blown up by their own people in despair, so that out of sixty-four large vessels, fifty-two grabs, and 200 sloops, only one grab and two sloops got away. Here, in 1688, the English fought their first battle in Bengal against the Nabob's troops, in which they were successful, though it was followed by a peace on conditions of a submissive tendency. In the district of Nuddea, adjoining to Calcutta on the north, is Plassey, celebrated for the bloody rout which decided the fate of Bengal in favour of the English, under Colonel Clive, against the Mogul Nabob. The town of Nuddea contains a Brahminical seminary, which the English have of late years encouraged by the institution of prizes.

The district of Midnapoor, on the confines of Orissa, is only partially cultivated. It suffered severely by a dearth in 1799. Here there is no seminary properly so called, that is, none for teaching the Hindoo and Mahometan law; but there are numerous schools for reading and arithmetic. The character of the teachers is on a scale of morality which must appear to persons of our habits ludicrous, or perhaps lamentable. An eminent teacher in Midnapoor was found, on a criminal trial, to be an habitual thief; yet the circumstance excited no surprise or disappointment, and was attended with no lowering of the individual in society. But we are not to suppose, from the prevalence of such instances, that there is a total want of honour among the people. There are temptations to which all are conscious that they habitually yield, yet there are others which appear to our habits much stronger, over which their sense of honour never fails to obtain a heroic triumph.

Midnapoor contains an indigent insulted race called Sontals, who are considered as outcasts, and not allowed to settle in the villages of the other Hindoos. They have villages allowed them between the cultivated lands of the other inhabitants and the unoccupied tracts, and their neighbourhood thus serves as a protection to the former from the depredations of wild animals. They are said to be industrious in their habits; but, from their ignorance of business, they are egregiously imposed on by money lenders, who often extort from them 100 per cent. on the sums which they advance. The people of Midnapoor are, on the whole, a simple and peaceable race, compared to those Hindoos who have more intercourse with the courts of justice.

To the north of Midnapoor and Hoogly is the district of Burdwan, distinguished by a comparatively high state of cultivation, like a garden in the midst of a wilderness. Its inhabitants amounted, in 1811, to 856,000, being at the rate of 476 to each square mile. It continues to improve, new villages are formed, and the number of brick buildings increases. It is the most fertile district in all India. The next to it is Tanjore in the Carnatic.

To the north of this are the districts of Birboom and Moorshedabad, the former of which contains coal, though not of good quality. Moorshedabad is the chief seat of the silk-weaving manufacture. Here gang-robbery, called "dacoity," is the most common crime. The city of Moorshedabad stands on the Cossimbazar branch of the Ganges, extending eight miles along both sides of the river. It is unfortified, the streets are narrow and almost impassable for carriages, and the buildings very indifferent. The streets are badly drained, and even in some parts overrun with jungle; the air confined and unhealthy. The city seems rapidly going to decay, unless some exertions to improve it are made on a decided plan and a comprehensive scale. In 1704, this city succeeded Dacca as the seat of government, under the Nabob Jaffier Khan. In 1757, when the English seized the government of the country, it was superseded by Calcutta, but continued the station of the collector-general till 1771. Moorshedabad is still a place of extensive trade. About a mile south from it is the town of Cossimbazar, on an island. It may be reckoned the port of Moorshedabad. Here the best silk stockings in Bengal, which are all wire-knit, are manufactured. In the midst of the adjoining marshes is to

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Drawn by W. Alexander.

Engraved by Middiman.

be found the magnificent palace of Motidchil.[a] So mild is the climate of this place, says M. Lagoux de Flaix, that the silk-worms spin their silk the whole year round on the mulberry trees, with which the island is covered.[b] The branch of the river which goes by the same name is a part of the most sacred line of the Ganges.

Proceeding northward we enter Rajshahy, a large district, which occupies the centre of the province, and is intersected in its whole length by the Ganges. Its capital is Nattore, between which and Dacca, in the south-east, there is, during the inundations, a navigation of 100 miles across the shallow lakes called jeels; the villages and clumps only appearing above the water, which has a gentle current of half a mile per hour. The town of Rajemahl, with its adjacent territory, is now attached to the Boglipoor division of Bahar, though in the province of Bengal. Here we find the magnificent ruins of the palaces which it contained when it was a Mahometan capital, and the seat of an important military government, commanding the famous pass of Telliagurry, and other mountainous passes between Bengal and Bahar, which were of so much consequence when the two Soubahs were hostile and independent. The town has now fallen to complete decay, though still a large place, and the resident population about 30,000, besides a number of travellers whom it always contains. There is in this neighbourhood a tribe called Tooppahs, who live on pillage, and dwell in villages under chiefs called Manchis. They have retained, from time immemorial, in the midst of their mountains, their wild independence, their language, their manners, and their religion.[c]

In the north-west corner of the province is the district of Purneah, bounded on the north by the Morung hills and woods, which separate it from the territory of Nepâl. Here the winter is colder than in the preceding districts, hoar frost is frequent in it, and proves injurious to the leguminous crops. Yet the district enjoys on the whole great advantages both in soil and climate, and is very productive. The potato has been introduced, and is regularly cultivated, though not used as a leading article of food. In 1801, the population of Purneah had nearly doubled in forty years, and consisted of nearly three millions; the Hindoos being to the Mahometans as fifty-seven to forty-three; but the latter have great influence, being in possession of a great part of the land. Purneah, the chief town, stands on a surface of nearly nine square miles, but contains only 40,000 inhabitants. This, like many other places in India, has been progressively deteriorating in salubrity without any apparent cause, and in 1815 had become so destructive to all classes, that it was thought necessary to remove the civil authorities elsewhere.[d]

Proceeding eastward, we enter Dinagepoor, which lies also a little south. In the winter months the cold here is considerable. The Europeans have fire in their rooms, and wear woollen clothing, while the natives, not so well provided, shiver in the night, and rise in the morning helpless and benumbed, till revived by the solar heat. In 1808, the population consisted of three millions, of whom 2,100,000 were Mahometans, and 900,000 Hindoos. The inhabitants, dastardly in the extreme, are the prey of gangs of robbers, whose depredations are facilitated by the numerous rivers. Ghoraghât, in this district, is a town and zemindary, which, like some others in the same quarter, was, at an early period of the Mahometan conquest, given to Afghân chiefs, who zealously propagated their faith. It produces raw silk, gunnies, (or sackcloth,) plenty of fruit, and Tanyan horses. The ruins of Gour, the ancient capital of Bengal, are situated in the district of Dinagepoor, twenty-five miles from Rajemahl. Several villages stand on its site; and it contains the remains of a mosque of black stone.[e]

The district of Rungpoor occupies the north-eastern extremity of Bengal, on both sides of the river Brahmapootra, having Bootân on the north, and Assam on the east. It labours under the local disadvantage of a frontier exposed to five independent states, Nepâl, Bootân, Cooch-Bahar, Assam, and the Garrows. It contains several swamps, and some beautiful clusters of lakes. To the east of the rivers Brahmapootra and Chonkosh, the country is interspersed with a number of detached hills. Bamboos are extremely abundant. The cocoa trees are very productive of well ripened fruit. The different grains are cultivated. Tobacco is the staple produce; sugar and indigo are also reared. Elephants are numerous; and the harmless rhinoceros common. Although here, as elsewhere, property of all kinds is secured by the British laws, yet the people have, in this quarter, little confidence in such settlements, not being able to conceive that the possessor of large sums of money can escape the rapacity of any sovereign power. The upper classes are ill informed, and their mode of living is contracted. They do not associate with one another, but lead secluded lives, surrounded by flattering dependents and amusing mendicants. The frontiers adjoining to Bootân and Morung are infested with a set of wandering robbers and murderers, called Keechuks or Geedarmars. The natives are unhealthy, and the children feeble. This country being a portion of the Hindoo Camroop, or region of sensuality, prostitutes form a regular society, subject to a separate priesthood. The women thus set apart undergo in early life the ceremony of marriage with a plantain tree. The Mahometans are more numerous here than the Hindoos in the proportion of ten to nine, and are gaining ground. But the two religions are on perfectly friendly terms, and the people apply frequently to one another's saints and deities when their own appear to fail. There are a few persons, named Asuric, who belong neither to the one nor to the other religion. The name given to them is equivalent to atheist. The town of Rungpoor, the capital, is a scattered place, containing about 18,000 inhabitants. The public offices of the country, however, are not here, but at a place called Dhap, where the Europeans reside. The houses, about 300 in number, extend along an excellent road, bordered with trees. Rangamatty is a town which was formerly inhabited by several Mogul chiefs, but is now a miserable place.

[a] Pennant's View, II. 294.
[b] Essai, tome ii. p. 376.
[c] Shaw, Asiatic Researches.
[d] Mr. Colebrooke. Dr. Francis Buchanan.
[e] Dr. F. Buchanan.

Goalpara, a town on the left bank of the Brahmapootra, twenty-three miles from the frontiers of Assam, is the principal mart of the intercourse with the Assamese, who bring coarse cloths, stick-lac, tar, wax, and occasionally gold, and take salt in return. But the Assamese are so disorderly, and so little to be trusted, (sometimes murdering their creditors,) that this intercourse is very inconsiderable. There are about twenty families of Portuguese here, who have entirely adopted the dress of the natives, can neither read nor write, and only understand a few words of Portuguese. The natives stand in some awe of them as a more vigorous race than themselves, and employ them as messengers for demanding payment of debts and other bullying purposes. They have little form of religion, and no priest. Sometimes ney go to Bowal, near Dacca, to have their marriages luly solemnized; but in general they content themselves with a public acknowledgment of marriage at home. There are large forests in this quarter, the timber of which may probably turn to good account; but its durability, and other qualities, have not been yet subjected to the requisite trials.[a]

The district of Cooch-Bahar formed the western division of the ancient kingdom of Camroop. The term Cooch, the name of a tribe, is attached to it to distinguish it from the large province of Bahar, of which Patna is the capital. One portion of the original Cooch tribe, called Panicooch, preserves a language quite different from the Bengalese, and has not adopted the Brahminical religion. A great proportion of the people live in extreme indigence; and some years ago they were in the habit of selling their children for slaves without scruple; but that traffic has been suppressed. This state was, for many years, subjected to great anarchy and misery, which the British attempted to remedy by temporary measures; but, in 1813, they took the management of it into their own hands, and reduced the Rajah, who is of a low and cruel disposition, to a state of real dependence, without that semblance of freedom which is generally left to those who are friendly and of good character.[b]

To the south of Rungpoor is the district of Mymunsingh, intersected by the Brahmapootra. This district is greatly improved of late years. The country near Bygonbarry, the capital, which in 1790 was a complete waste, the haunt of wild beasts and river pirates, is now well inhabited. The Hindoos have some gratuitous schools for their own learning. It is reckoned disgraceful to receive payment for teaching. In 1813, the number of gang robberies said to have been committed was sixty-three, and the gangs were exceedingly formidable. The capital, Bygonbarry, is of modern creation. The other large town, Serageguge, is on the Jhinai river; it appears in no map, yet it is thought by some to be the most trading place in Bengal, next to Calcutta.[c]

Silhet, a district to the east of Mymunsingh, is the most easterly of the British provinces of Bengal. It is thought to be only 350 miles from the province of Yunan in China; but no intercourse has taken place between the two countries in that direction, nor have the intervening regions been explored. On the east it is bounded by a lofty chain of mountains continued from Arracan and Chittagong, inhabited by savage tribes, who rank very low in the scale of humanity. The town of Silhet is surrounded with peaked conical hills. During the inundation of the Soormah and other rivers, the greater part of the land is laid under water. There is a navigation at that season between it and Dacca, over fields which produce rice during winter, but during the rains are covered with eight or ten feet of water. Rice is the chief produce. But the cultivation is greatly impeded by the inroads of the Kookies, a savage race of predatory mountaineers, who inhabit the Tiperah and Cachar hills, to which they instantly retire after their sudden incursions. This is one of the three only localities in India found capable of producing good oranges; the other two being Chandpoor in the Dacca district, and Sautghur at the foot of the eastern Ghauts, or passes leading from Bangalore to Madras. There are large plantations of orange trees, like forests, in Silhet; and the quantity of fruit annually exported is very great.[d] On the spot they often cost no more than one rupee per thousand. Silhet abounds in lime, which is transported by water during the inundations. A sort of coal has also been found here, but of indifferent quality The landed proprietors have the character of bad managers. They fall into arrears in their payments to government, so that their estates are frequently exposed to sale: they are also irregular and litigious in their transactions with one another. There is a race of mountaineers called Cosseahs, who at one time occupied part of the low country, but scarcely ever paid the revenue due to government, and always fled to their native mountains when any attempt was made at coercion. Being in consequence dispossessed of their lands in the low country, they in revenge afterwards committed many murders and other enormities, till forts with garrisons of sepoys were established to hold them in check. The Cosseahs are said to be an honest, fair-dealing set of people, and marked by strict veracity, but outrageously vindictive. It is expected that the intercourse now established will have a tendency to civilize them. This, however, is always uncertain. It may impart to them a new set of vices. The practice of selling their children and others for slaves, has always been carried to a great extent in the district of Silhet. Here the Moguls, according to Abul Fazel, procured eunuch slaves for the seraglio. Some of the free natives are still inveigled off for sale to the different towns of Bengal; but such attempts are now rarely successful, being vigilantly resisted by the British government.

To the south of Silhet lies the district of Tiperah, named also Rooshenabad, of large dimensions, forming the chief eastern boundary of Bengal. Its limits to the east are indefinite; that country being extremely wild, overgrown with jungle, and abounding with elephants. That portion of Tiperah which lies near the river Megna is rich, well cultivated, and commercial. The manick or zemindar of Tiperah possesses an independent sovereignty beyond the hills, but usually resides in the Bri-

[a] Mr. J. Grant. Dr. F. Buchanan.
[b] Dr. F. Buchanan. Description of Hindostan by Walter Hamilton, Esq. vol. I. p. 214.
[c] Hamilton's Description, I. p. 189.
[d] Rennel's Memoir. Colebrook. Dr. F. Buchanan. Hamilton's Description, &c. vol. I. p. 191

tish head quarters at Comillah. The district contains no large towns, but many of moderate size, such as Luckipoor, Daoodcaundy and Chandpoor. It was an independent Hindoo principality long after the Mahometans had possession of Bengal, though Dacca, the capital of the latter, was in its near neighbourhood. It was not till 1733, when the Mogul power was itself falling to pieces, that Tiperah was brought under its full influence. In 1765, it devolved to the British government. In 1801 it was estimated to contain 750,000 inhabitants, in the proportion of four Hindoos to three Mahometans; but this was undoubtedly an exaggeration. It long continued one of the most disturbed districts of the province; but, of late years, gang robberies have been almost entirely suppressed, and other heinous offences have become comparatively rare. The territory round Chandpoor is famous for producing the very finest oranges in India.[a]

On the west of Tiperah is the district of Dacca Jelalpoor, distinguished as the granary of rice for Bengal. Since the famine of 1787, this district has been progressively improving. The landed property is divided into small portions called talooks, which are subdivided again to an extreme degree of minuteness. Hence civil causes, on the subject of property, are numerous and intricate. In 1801 this district contained nearly a million of inhabitants, one half Hindoos, and the other Mahometans. The change in social condition, freedom of industry, and security of property, is similar here to what it has been in the adjoining districts. The chief town, Dacca, is situated beyond the principal stream of the Ganges, about 100 miles above its mouth by land, but 400 by the winding course of the river. It is admirably situated for trade, is on the whole wealthy, and in population and extent the third city in Bengal. It has, at different times, enjoyed great splendour and prosperity. In the time of Aurengzebe it seems to have been a rival to the greatest cities, with the exception of Gour. Again, in 1774, it was made the centre of law and revenue, and exhibited great opulence. When the provincial council was abolished, and judges and collectors were appointed to the different districts, it fell off; but the mercantile and industrious classes have not decreased, and its limits have been extended. Towards the end of the seventeenth century Dacca was the residence of Azim Ushân, Aurengzebe's grandson, who began and nearly completed a magnificent palace, now in ruins. It contained, at the same time, an enormous gun of hammered iron, weighing about 64,814 pounds, and the shot for it must have weighed 400 pounds; but it is not probable that it ever was discharged. The present city extends six miles along the river, the houses made of brick and thatch, the streets very narrow and crooked. The thatch houses are generally burned down once, and often twice, in the year, the owners looking on with indifference. Their valuables, being contained in earthen pots sunk beneath the floor, do not suffer, and the houses are easily rebuilt at the expense of a few rupees. This city formerly manufactured beautiful fabrics, which were held in great estimation at the court of Delhi, and also at that of France. Its prosperity has been materially affected by the French revolution. In 1801 its population was estimated at 200,000, though then comparatively in a state of decline, and the Mahometans were to the Hindoos in the proportion of 145 to 130. The society of the place is diversified by many respectable Greek, Armenian, and Portuguese merchants, settled in it. The inhabitants are remarkably orderly, and seem attached to the existing state of things.

The district of Chittagong is situated to the south of Tiperah, in the south-eastern extremity of Bengal, on that part of the coast which turns round to the south-east, forming the commencement of the region called "the Peninsula beyond the Ganges." It is more detached than any other portion of the province, being in contact only with Tiperah in a narrow part of its northern extremity. On the west, it is bounded by the bay of Bengal; on the east, by the Birman empire; and on the south, by Arracan. About two thirds of the soil are unproductive and hilly, and one third plain and arable; the former being chiefly the parts farthest from the sea-coast. Its capital, Islamabad, on the Chittagong river, is, according to M. Wahl, the *Bangala* of the Arabian writers; it is an accessible sea-port, well situated for external commerce, as well as for the construction of large ships, of which a considerable number are built annually, both of imported and indigenous timber. Being reckoned a healthy country, it is the frequent resort of invalids from other parts of the province. Its inhabitants consist of Mahomedans, Hindoos, and Mughs. The Mahomedans are to the Hindoos as three to two. The Mughs are natives of Arracan, who have been driven from that country by the oppressions of their chiefs, or of the Birman government, by whom they have been subdued, or who have been induced by predatory habits to live in the most rugged localities of this district. These are a much more vigorous race than the Bengalese natives; but addicted to murder as well as robbery. A considerable profit accrues to government from the elephants caught in the forests of Chittagong, which are possessed of excellent qualities, and well fitted for the camp and the chase. At an early period of its intercourse with Europe, Chittagong was inhabited by some irregular Portuguese, who were in the practice of pillaging the adjoining countries. The hills in the north and east are inhabited by a savage people called Choomeas. Beyond them are the Kookies, who live in a state of perpetual war, and esteem bravery, cunning, and the slaughter of their enemies, the highest merits that any man can possess. The land of this district is divided into very small possessions, and there are always numerous litigations on questions of boundaries.[b]

At the mouth of the great Megna, formed by the united streams of the Ganges and Brahmapootra, is the isle of Sundeep, which was taken from the Moguls, and erected into an independent principality in the end of the 16th century by Sebastian Gonzales. It was taken in 1616 by the Arracanese, who, under the name of Mughs, infested and devastated the neighbouring parts of Bengal, carrying off the inhabitants into slavery.

[a] W. Hamilton's Description, &c. vol. I. p. 176.

[b] W. Hamilton's Description of Hindostan, vol. I. p. 167.

It was afterwards taken by the Moguls in 1666, and devolved to the East India Company along with the whole province of Bengal.

We shall now take a view of the mountainous countries which lie between the plains of the Ganges and the plateau of Thibet. Some of these were wholly unexplored, till recent transactions led the British armies to them as the scene of warlike operations.

This is particularly the case with the tract situated between the rivers Sutledge and Jumna, which the last war with the Ghoorkas has brought into the view of Europe, and which was the scene of the tour lately published by Mr. Fraser.[a] That territory is divided into about thirty political communities, four of which, being considerably larger than the others, are called principalities. Such was its condition before it was subdued by the Ghoorkas, and to this it has been nearly restored since the expulsion of that foreign power by the British arms. Though the people are almost all aboriginal, the rulers have been always strangers, who seem to have come among them on some of their pilgrimages to the sacred places, and finding them barbarous and ignorant in the extreme, easily subdued them. The chiefs were almost always in a state of mutual war, till they were invaded by the Ghoorkas in 1803. In 1814 it was wholly occupied by this people, who had not only committed great excesses in the prosecution of the war, but kept up a rule of the most oppressive description. They maintained here a force of 7000 men, 5000 of whom were regular troops, armed with muskets like the sepoys. Many of the old forts which they could not conveniently occupy were destroyed. The revenue extracted from it by Ummer Singh, the commander, never exceeded 282,000 rupees, (L.28,200.) In 1815 Sir David Auchterlony took the country after a hard contest, in which the fortresses of Jytok and Almora sustained the attacks of the Europeans with a bravery and perseverance seldom before displayed by the military powers of India. This conquest cost the victors no trifling expenditure of blood and treasure. The country was, with a few exceptions, put in possession of the former expelled chiefs. Very few of them pay tribute to the protecting power. They have engaged to submit their disputes to British arbitration, and to furnish a specific number of hill carriers in case of military operations in their country, the only mode of conveying baggage over these rugged regions being by human labour. The moral character of the indigenous mountaineers is represented in very unfavourable colours, as destitute of gratitude or honesty; they perpetually rob one another, and the poorest individual who has a rag on his back is made an object of plunder in passing from one village to another. The long distracted state of the country, and its extremely minute division into petty independent jurisdictions, generated or maintained this state of peculiar degradation. Their subjugation to harsh masters, and the exactions to which they have been subjected, have rendered them indolent in the extreme. Their physical constitution is far from being robust. The four largest principalities are Cahlore, (situated on both sides of the Sutledge,) Hindoor, Sirmore, and Bussaher. The legitimate Rajah of Sirmore, Kurrum Perkaush, whose birth would have induced the victors to re-establish him, was so bad a character that he was set aside, and his son, a minor, seated on the guddy, (or throne,) under the guardianship of his mother. Kurrum Perkaush had, during his possession of the sovereignty before the Ghoorka conquest, murdered every person of worth in his dominions, so that the existence of such characters was only a matter of tradition: yet in 1816, when this person had every appearance of drawing near his end, his wife declared her resolution to terminate her life at the same time. Nahan, the capital of Sirmore, is a large open town, populous and handsome, situated on a level spot on the top of a lofty mountain. It stands about 2000 feet above the level of the plain. From the top of this and the neighbouring mountains, a magnificent view is obtained of the plains of Sirhind to the south, the south-west, and south-east, but to the northward, the view is terminated by the snowy mountains.—Bussaher occupies the northern extremity of the territories between the Sutledge and Jumna. This state pays a tribute of 15,000 rupees, (L.1500) per annum. Rampoor, its capital, is a great mart for the goods of Thibet, those of the hills, and of the plains.—Poondur is a remote and barbarous community among the hills, the particular circumstances of which are imperfectly known. It has never been subjected to the full control of any foreign power, such as that of the Ghoorkas. The people demand black mail of several of their neighbours, and delight in the life of liberty and plunder which their situation enables them to lead.[b]

To the east of the river Jumna lies the province of Gurwal. The southern part of this county is an assemblage of hills of the most diversified and irregular kind, short and narrow ridges in all varieties of angles and mutual attitudes, and separated by confined valleys. The people of Gurwal and of Kumaoon are called Khasiyas; and their language also goes under that name, from the word Khas, the name given to the aborigines, who are reckoned an impure race; for this reason the present inhabitants disclaim that appellation, and pretend that their progenitors emigrated from the south. Kumaoon lies east and south from Gurwal, being separated from it by a small river; but the inhabitants of the two territories are widely different from each other. Those of Gurwal are comparatively strong and active, and earn their subsistence in a great measure by labouring as carriers to the pilgrims who visit the holy places. The Gurwalians fix their burdens on their backs with slings, but the Kumaoonees carry them on the head, their country being somewhat less precipitous, so as not to demand so imperiously the free use of their hands in climbing. The people of Gurwal, however, have always crouched beneath any political yoke, however galling, without making the least effort to assert their independence, though their country is strong and well adapted for defence. Here the Bhagirath and Alcananda streams unite to form the Ganges. The country fell

[a] See Journal of a Tour through part of the snowy range of the Himâlah mountains, and to the sources of the rivers Jumna and Ganges, by James Baillie Fraser, Esq. 4to. 1820.

[b] Fraser's Journal.

under British influence in 1814. The Rajah of Serinagur was re-established; but, as his former capital is situated in a part of the territory which the British retained in their own hands, he subsequently fixed his residence at Barahât.[a] The river Alcananda is the Rajah's eastern boundary, and to the east of it lies the mountainous province of Kumaoon.

Serinagur, the late capital of Gurwal, occupies a central situation in a valley about three miles long, surrounded by barren mountains, on the east side of the river Alcananda. It is of an elliptical form, and about three fourths of a mile long. The houses are roughly built of stone and earth, generally two stories high, and roofed with slate. The house of the old Rajahs is of granite, and four stories high. The river Alcananda, on which the town stands, has made great encroachments on it; an earthquake in 1803 has also injured it greatly, and in 1815 the British found it in a most ruinous condition. The inhabitants are chiefly emigrants from the low countries, and the leading persons are the agents of the banking houses at Nujibabad and in the Doab, who are engaged in the traffic of specie. The British retain possession of the valley of Deyrah Doon, situated between the Jumna and Ganges, and of some importance in a military point of view. Kalunga is an important fortress in Gurwal, which, in 1814, stood two separate attempts to carry it by storm, but was afterwards abandoned by the garrison during the preparations made for a third assault. A little to the north-east of this fortress are many caves, inhabited by a race of people nearly in a state of nature, who live on rice of a remarkably large grain. The caves extend for some distance into the rock, and are frequently a considerable height from the ground, and ascended by rope ladders. In this country are some of the holy junctions of the Gangetic streams called Prayagas, and the two sources called Gangootree and Kedarnath. Bhadrinath is a town consisting of twenty or thirty huts, with a temple, and a warm spring used as a bath. The whole territory is filled with sacred places, which the Hindoos make a merit of visiting, and pay stated sums in the form of offerings, at numerous places, in the course of their religious tour.

Between the rivers Alcananda and Cali, lies the Hindoo principality of Kumaoon. Here the surface is less broken than in Gurwal, the plains are spacious, and the hills of easy ascent. The population is denser, and the cultivation carried higher up the hills. The towns and villages look well at a distance, but, on nearer inspection, are found dirty. The houses are two stories high, the ground floor being occupied by the cattle. The people dress in cotton stuffs, while the Gurwalians dress in wool. Their dispositions are mild. Polygamy is much practised among them. The men take the charge of the household affairs, while the women undertake all the drudgeries of agriculture. They are very much under the influence of the Brahmins, who, previously to the subjugation of the country by the Ghoorkas, raised and deposed the Rajah at pleasure. Almora is the capital of Kumaoon, and was the scene of important and well contested military actions in 1815. There is a subdivision of the Kumaoon district called Painkhandi, very precipitous in its surface, containing the snowy peak of Rhamnee, 22,700 feet above the ocean. The hills abound in timber. Some of the cedars are of enormous size. Some specimens of them have measured 27 feet in circumference at the height of four feet from the ground, and 180 feet in height. Hemp grows with uncommon luxuriance, being ten or twelve feet high, with wide spreading branches. There is a plant, resembling butcher's broom, from which the inhabitants make a paper which is in request among the native bankers of India for bills of exchange, as being only moderately bibulous, and stronger than other paper. Birch bark is used for writing on, and quantities of it are sent to Lucknow, where it is used to line the snakes, or winding tubes, of the hookahs. Several of the inhabitants are Bhootees. There are ten villages among the snowy mountains inhabited exclusively by that race. They indeed occupy in general the alpine heights nearest to the snowy Himâlahs, both on the north and south side. They are entirely devoted to religious observances and commerce. On some occasions they are concerned in military operations, but rather unwillingly. They are darker in complexion than the other mountaineers. They adhere to the lama religion, which they mix with several Hindoo superstitions. Some of these tracts are only inhabited in the summer months: such as the village of Malari on the Niti road. In Gurwal and Kumaoon the sale of children was a daily practice, and a subject of taxation under the Ghoorka government, but has been abolished by British authority.[b]

To the east of these countries lies the kingdom of Nepâl, one of the largest and most compact sovereignties of modern Indostan, comprehending nearly two thirds of the northern hills of India. The name of Nepâl properly belongs only to one magnificent valley, the rest of the kingdom consisting of other conquests of the Ghoorkas, who are its masters. This kingdom is in the form of a parallelogram, all the sides of which, except the northern, are bounded by the British possessions. It in general extends about twenty miles into the plains of Indostan. To the north of this flat belt, there is a range of low hills, between which and the high mountains there are fine valleys of considerable length; these are well cultivated, and called *doon*, a term synonymous to "strath" or "glen." Along the bottoms of the hills there is a rich low tract, which is left without cultivation, on account of its extreme unhealthiness;[c] though some parts which have been well cleared appear to be tolerably healthy.—A great part of the country among the hills is very productive in grain and various fruits, such as pine apples, peaches, grapes, and oranges. Ginger and cardamoms form part of the valuable produce of these tracts. Much of this mountainous region consists of granite: it contains much iron, lead, copper, some zinc, and a little gold in some of the rivers: it also contains mines of sulphur. The breadth of the hilly region, between the plains and the alpine region, is about thirty or forty miles at Catmandoo, the capital, but it is greater in the western parts. The alpine region itself is of equal

[a] Dr. F. Buchanan. Mr. W. Hamilton, vol. II. p. 633, &c.
[b] W. Hamilton's Description of Indostan, vol. II. p. 648.
[c] Col. Kirkpatrick's Account of the Kingdom of Nepâl, p. 20.

extent. The snowy ridge winds considerably, but has few interruptions, and is in most places quite impassable.

The numerous valleys interspersed among these mountains are inhabited by various tribes, differing in language and customs. Those who have any pretensions to be aboriginal have the Mongolian character and aspect. The most fertile part of Nepâl Proper was formerly occupied (and still in a great measure is) by the Newars, a race addicted to agriculture and commerce, and far more advanced in the arts than any of the other mountain tribes. They profess the doctrines of Buddha; but instead of acknowledging the Lama, they have a priesthood of their own. They have also adopted the Hindoo practice of division into castes. In the more rugged parts, there is a tribe called Murmi, a robust race, who live by agriculture and the carrying of burdens. They are hated by the Ghoorkas, for eating the flesh of the cow; and, not being permitted to kill these sacred animals, they eat those that die a natural death. The Hindoo inhabitants of Nepâl have the character of being both abject and arrogant, debauched, jealous, and revengeful. The Ghoorka military are more orderly than that which was previously maintained by the native Rajahs, but inferior to the British sepoys. They are armed with matchlocks, for which they do not use cartridges. The war standard exhibits, on a yellow ground, the portrait of Huniman, a gigantic monkey and Hindoo demigod.

The most select portions of the Ghoorka territories consist of two delightful valleys, called Great and Little Nepâl. The large valley is nearly circular, watered by numerous rills, running from the mountains, and meeting in the centre, in the Bogmutty. Here is Catmandoo, the capital, which stands 4784 feet above the plains of Bengal. Hence, though in lat. 27° 50′, it enjoys a climate similar to that of the south of Europe; the temperature of the springs is 64°. The periodical rains extend to this spot. The hoe is the great instrument of cultivation, but extremely awkward from its shortness, obliging the workman either to stoop greatly, or to sit on his heels, the last of which postures he generally prefers. They have numerous water-mills for grinding corn, an improvement not known in southern Indostan. There are considerable manufactories of copper, of brass, and a kind of bell metal. They make bells, but not equal to those made in Thibet. They make several bell metal vessels, and sell them along with those of brass and copper in Thibet. The great mass of the inhabitants dwell in the valleys. Both the hills, and the low country called Terriani, are very thinly peopled. The Newars are much more numerous than the Parbutties, or mountaineers. To them also the cultivation of the soil is generally confined. They are despised by the Parbutties as an unwarlike race, and are treated with oppressive rigour and extortion by their rulers. They have in some degree the Mongolian features, but with a much wilder expression. Most of the servants are slaves. Some Brahmins are slaves to Rajepoots, and act as cooks, which is considered as a situation of great dignity. It is reckoned disgraceful in any one to sell his children to an infidel, or a person of impure caste, although this is sometimes done in urgent cases; and the individual who does it does not on that account lose caste. He would, however, incur this dreaded calamity, if he should at any future time receive such a child again into his house. The female slaves of the Maha Ranny, or Queen, are allowed some peculiar privileges, and have considerable influence at court. In the day time, they attend their royal mistress; and when she goes out, some of them follow her as a body guard, dressed and riding on horseback like men, and armed with swords. Catmandoo is estimated to contain a population of 20,000. There are some other fine cities in the same valley; as Lalita Patan, which contains 24,000 inhabitants, and was formerly the capital of an independent state. Bhatgony is another, which was also a capital before the Ghoorka invasion. In the hills on the south side of this valley are the sacred springs of the Seher at the village of Sulti Khul. They contain multitudes of small fish, which are never touched, the inhabitants believing that any attempt to steal them will be followed by instant death.[a]

The other valley is called Noakote, about six miles long, and one and a quarter in breadth; possessing an extremely fertile soil, and capable of bearing all the productions of Bahar, though hemmed in by the snowy mountains on the north. Though so near the hills, it appears not to be quite so elevated as that of Catmandoo. The heats are so great after April that the country is not habitable, on account of the prevalence of the fever called the Owl.[b] North from Catmandoo, at a distance of thirty-seven miles taken in a straight line, though requiring eight days to accomplish the journey, is Nielkantha, a town of pilgrimage, which is visited about the end of July and the beginning of August, though the road is scarcely passable, on account of the depth of the snow; avalanches and glaciers being frequent. During this short period a fair is held here, and many shops are opened; but when the cold season sets in, it is abandoned by all its inhabitants, who remove to a milder climate. The name signifies "a blue throat," and is an epithet of Siva, originating from an exploit said in the Hindoo mythology to have been performed by that deity.

Immediately west from Nepâl Proper, is a country of considerable extent, "called the territory of the twenty-four Rajahs," because it formerly consisted of that number of petty states under Rajahs who acknowledged the superiority of the Jemlah Rajah. One of these is Ghoorka, the original seat of the power which has made such extensive conquests in those regions. Jemlah was once bounded by Gurwal, and had the ascendency over numerous states. It contains a fine valley, indented with deep ravines, twenty miles long, and ten wide, resembling that of Nepâl, but more checquered with hills. It is well cultivated, and contains valuable mines of rock salt. The Bhootees, who are Lamaists, form the majority of the population; but all the accounts which we have of it have reached us through the medium of natives, as it has not yet been visited by Europeans.

Mucwanpoor is an important district, subject to the Rajah of Nepâl. It was formerly more extensive than it now is. It lies chiefly to the south of the Nepâl valley, and the San Cosi river. One half of it is in the

[a] Kirkpatrick's Nepâl, p. 75. [b] Ibid. p. 117.

level country called the Terriani, a belt about twenty miles wide. This contains some hilly and poor land, but the greater part of it is rich, though uncultivated, and on this account abounding in elephants and rhinoceroses. The breed of elephants is of a very inferior kind. The native Rajahs formerly encouraged the exuberance of the jungle for their own defence, cultivating a few rich spots which were concealed in the bosom of the forests. Under the Ghoorka dynasty, it has been more extensively cleared. It produces excellent tobacco, and some red cotton. To the north of the Terriani, Mucwanpoor consists of a gradation of small hills abounding with pines. The peasantry all over this district are dirty and poor. At the conclusion of the last war of the British with the Nepâlese government, the former proposed to restore an old Rajah to the possession of a great part of this territory; but the matter probably remains still unsettled, being put off by the pertinacity of the Nepâlese. To the east of Nepâl Proper, the mountains are chiefly occupied by two tribes called Kirauts and Limboos intermingled, both subject to the Ghoorkas. They are not sincere followers of the Brahmins, but are compelled by their present rulers to abstain from the flesh of the cow, for which they have a strong predilection. With Thibet there are two roads of communication from Nepâl. Morung lies on the east of Mucwanpoor, and is similar to it in physical character. It continues subject to the Ghoorkas, with the exception of a section extending thirty-five miles to the west of the Teesta.

To the east of Morung lies the principality of Sikkim, about sixty miles long, and forty broad. The greater part of it is included between the two arms of the river Teesta. The inhabitants are of the Lapcha tribe. They mostly profess Lamaism, eat beef, pork, and other animal food held by the Hindoos in detestation, drink ardent spirits to excess, and do not marry their females till they arrive at maturity. They are not so enervated by excess in religious devotion as the Bhootees; hence, though the latter had the ascendency in the government previously to the Ghoorka invasion, the armies consist chiefly of the more vigorous Lapchas. In 1788, the Ghoorkas, in a desperate contest near to the capital Sikkim, defeated the Rajah, and soon after obtained possession of the principality; though the submission of the people and their leaders was only partial, and accompanied with much annoyance to their masters, who afterwards gave them a chief of their own tribe. In the rupture between the Ghoorkas and the British in 1814, the Rajah declared in favour of the latter, and at the pacification was reinstated in a considerable portion of his mountain territory, together with a tract of low land ceded by the Ghoorkas, essential to the support of his people. This is rich, but not all under cultivation. The chief produce is rice and madder. In consequence of their coincidence in religious faith, this state keeps up more intercourse with Thibet than any other on the south side of the snowy mountains, and it is through this medium that all communication is conducted between India and the Chinese authorities on the north side of the Himâlah mountains. The establishment of a state independent of the Ghoorka sway, and under friendly relations with the British government, has arrested the progress of Ghoorkan ambition to the eastward, where Bootan would have fallen an easy prey, and the approximation of this power to the Birman empire might have generated scenes of the most extensive warlike confusion. The fort of Naggree, in Sikkim, is a place of uncommon strength, which the Ghoorkas gave up with much reluctance, and which the British have strengthened for the Rajah with some powerful pieces of ordnance.

Contiguous to Sikkim on the east, is Bootan, the country of the Deb Rajah, which we have already noticed in our account of Thibet, estimated at an extent of 250 miles in length, and ninety in average breadth. It is entirely mountainous in its northern part, the reverse of Thibet, which is a level table land. At the base of the hills, near the frontier of Bengal, there is a valley choked up with jungle, and unhealthy. The face of the country in general is greatly diversified, and there are places of very opposite climates in sight of each other. There is a good deal of agricultural industry, and irrigation is much attended to; the labours of the field are devolved on the females. Wild animals are not numerous in Bootan; but monkeys of a large size and a handsome form abound, and are held sacred by the Bhootees, as well as by the Hindoos. A caravan dispatched by the Deb Rajah annually visits the Rungpoor district, bringing with it the coarse woollen manufacture of the country, Thibet cowtails, walnuts, ivory, musk, gold dust, silver in ingots, Chinese silks, tea, paper, and knives, besides horses; it takes back in return, English woollens, indigo, dried fish, quicksilver, cloves, nutmegs, incense, sandal wood, copper, tin, gunpowder, hides, cotton cloth, and pigs. The value of the whole scarcely exceeds 30,000 rupees; and the indigo forms one half of it. This timid government will not permit any caravan from Bengal to enter Bootan. The military weapons of the Bootaners are bows and arrows, short strait swords, faulchions resembling pruning hooks, and a few bad matchlocks. The people are of large stature, many of them six feet high; more ruddy and robust than the Bengalese, but very subject to glandular swellings in the throat. Their eyes and features are in a great measure Mongolian. Their skins are smooth; and they have no beard till well advanced in years. Tea is much used among them. Their manner of preparing it is to mix together flour, salt butter, bohea tea, with some other astringent vegetable, and water; boil them together, and beat them up. When they have finished the cup, they lick it clean with the tongue. Their houses have only one story; but the palace of the Deb Rajah has several, which are ascended by lofty stairs. The country, being mountainous, abounds in bridges hung on iron chains. When the Deb Rajah takes a dose of physic, his physician is obliged to swallow an equal dose. The ministers of religion are quite distinct in their habits from the people, and the latter take no part in matters of spiritual concern. The Deb Rajah, their governor, is considered as the secular vicegerent of their spiritual prince, called Dharma Rajah, a supposed incarnation of the deity, who sometimes interposes his opinion with an air of authority. The people of the low countries belong to subdued tribes, and the true Bootaners live in the mountains; sometimes de-

scending to enforce obedience from the people of the plains, to inflict chastisement, or to invade the neighbouring states. On such occasions, it is said that their attacks exhibit a horrid combination of cowardice, perfidy, and diabolical cruelty. It was in 1772 that this country first fell under the observation of the British, in consequence of a sudden invasion made by the Deb Rajah on the territory of Cooch Bahar. Two battalions of native infantry were employed to drive them back, and pursue them into their own country, when the fortress of Dellamcotta was taken by storm. On this occasion, the Deb Rajah obtained a peace through the mediation of the Teshoo Lama. The town of Tassisudon, the capital of Bootan, stands in the middle of a cultivated valley, which is about three miles in length, and one in breadth. The castle or palace is of a quadrangular form. Near it is a long line of sheds, where workmen are employed in forging brazen gods, and other ornaments for the houses.[a]

On the south of Bootan, and extending a great way to the east, is the kingdom of Assam. It adjoins the province of Bengal, at the north-east corner, about the 91st degree of east longitude. It is thought probable that it comes in contact with the kingdom of Ava on the east, about the 96th degree of longitude, and is at that part 180 miles from Yunan in China. It is the basin or valley through which a large portion of the river Brahmapootra flows. The average breadth of the valley is about seventy miles, but the present territory of the Rajah of Assam no where reaches the hills,—these belonging to the Deb Rajah of Bootan. The western province is named Camroop, extending nearly as far east as the celebrated temple of middle Kamakhya. The long island formed by the division and re-union of the river, contains many low woody hills, and a great extent of fine low land, possessed of great natural fertility. The middle province, or Assam Proper, is more extensive than the western. No European has penetrated much farther than Gohati, the capital, situated at its western extremity. Its length is not known. It comprehends the northern half of the western island formed by the Brahmapootra, and the whole of the very large island named Majuli. It is more fertile, and less hilly than Camroop. The third province is a small and insignificant tract, of which very little is known. For a great way to the east, no part of this state lies on the south side of the river. On the north Assam is bounded by the mountains of Bhootan, Auka, Duffala, and Miree, and on the south by the Garrow mountains, which become higher as they extend east, and change the name of Garrow to that of Naga. The animal and vegetable productions are similar to those of Bengal. Three fourths of the produce consist of rice. The trade of this kingdom has diminished of late years, and the number of its inhabitants has been reduced by the violence of intestine broils. It is a rule of state in Assam that no person of the royal blood can succeed to the throne if he has any blemish or scar on his body; and it is sometimes the practice to mark artificially those who are not to succeed to the crown, in order to prevent civil wars about the succession. The criminal code is cruel in the extreme; but among the rich its punishments are easily averted by bribery. All the members of the family of any rebel, both male and female, are capitally punished. Rafts covered with human heads are sometimes found floating down the Brahmapootra, supposed to be supplied from this source. The population is supposed to be under half a million: about three fourths of the country are uncultivated jungle. It contains no shops nor markets, and their towns are merely groups of the most miserable hovels. The national character has deteriorated since the introduction of the Brahminical religion. They have become more pusillanimous towards foreigners, and more disunited among themselves.[b c]

In the neighbourhood of Assam, to the west and the north, there are a few states or principalities which maintain more or less show of independence. Such is Bidgenee, the Rajah of which has part of his possessions within the limits of the Bengal province, subject to the English, and another part within the territory of Bootan, while the spot on which his capital is situated is a sort of neutral ground, deriving a degree of independence from its ambiguous position. Here the prince is suspected of harbouring bad characters, and sharing in their plunder. He pays a tribute of 2000 rupees to the English.[d]

The tribe called the Garrows occupy a portion of the territory included in the great bending of the Brahmapootra, where, from running west, it turns to the south. They formerly occupied this territory to the margins of the river, but are now confined to an inland hilly district. They are a ferocious and irregular set of people, and a military establishment is required in their neighbourhood, to hold them in check during the fairs. Mingled with them are some hostile tribes, who have subdued portions of their country, particularly on the banks of the river. They are a more robust race than the Bengalese, both men and women are active in their habits, and would be industrious if they were secured in a fair recompense for their produce. But their transactions with their neighbours are said not to be subjected to good regulations on the part of the latter. They eat all sorts of animal food, including dogs, cats, frogs, and snakes. Milk they hold in abhorrence, as a kind of excrementitious matter. They are partial to puppies, which they cook in the most cruel manner that can be conceived. They first make the animal eat as much rice as its stomach will receive, then tie his four legs together, and throw him on the fire. They take out the animal when sufficiently broiled, rip open the body, and divide the rice in equal shares among the party assembled. This process has been repeatedly witnessed by the Bengalese traders. They have some other characteristic barbarous customs. When a quarrel arises between two Garrows, the weaker party escapes to a distant hill: both parties plant a tree bearing an acid fruit called chatakor, and swear solemnly to embrace the earliest opportunity of eating their adversary's head with the juice of its fruit.

[a] See Capt. Turner's Account of Thibet, and Dr. F. Buchanan.
[b] See Mr. Wade's work. Dr. F. Buchanan.
[c] Previous to the late Burmese war, Assam had been overrun and wasted by the Burmese, and in the E. part by the Sinphos, a warlike tribe from the W. frontier of China. It is now under British protection.—*As. Journ.*—P.
[d] Dr. F. Buchanan.

If no opportunity occurs for many years, the feud is handed down with undiminished virulence to posterity. The party which eventually succeeds in cutting off the head of his adversary, boils it with the fruit of the tree, eats part of the soup, and distributes the remainder among his friends: the tree is now cut down, and the feud is ended; the party of the deceased, instead of indulging the spirit of vengeance, acquiesces in the award of the good fortune of the other. They set a high value on the heads of Bengalese people, especially when they belong to persons of rank. When they separate one from the body, they bring it reeking among their friends, fill the skull with victuals, eat out of it, and accompany the feast with dancing; then bury it for a length of time sufficient to make the flesh separate easily from the bones, after which they dance round it as before, and hang it up as a trophy in the house of the murderer. Such a skull has its value in exchange like any other piece of property. It forms, in fact, a circulating medium; and the value is in proportion to the rank of the individual. The head of a Hindoo factor who had purchased the zemindary of Caloomaloopara was valued at 1000 rupees; that of a common peasant costs ten or twelve. That none of their own people's heads may be passed off in this manner, they make a point of burning the bodies of their dead to powder. Domestic feuds are numerous; but they have courts held by their chiefs for settling disputes. These courts do not inflict any punishment, unless a man is detected in uttering a falsehood before them, which incurs the penalty of instant death. Dishonesty and stealing are not frequent, but murders are daily occurrences. Those who are not converted to the Brahminical religion believe in the transmigration of souls. Their supreme god has a wife, though no children. They have no images or temples. They do not write their own language; a few among them can read and write Bengalese. This description applies chiefly to the northern Garrows. The southern are partially converted to the Brahminical religion. Their colour is sometimes a light, sometimes a deep brown. They have a surly look, a flat nose, small eyes, a wrinkled forehead, overhanging eyebrows, a large mouth, thick lips, and a round face. The women are singularly ugly, short and squat, but strong-bodied, and work at all occupations. Intoxication is very common, and is the cause of many crimes.[a]

Cachar, on the south of Assam, is a large territory, which the Birmans have invaded with various success, sometimes being obliged to retire on account of the unhealthiness of the country, and sometimes succeeding in exacting tributary engagements. Between Cachar and Arracan lies Cassay, or Munipoor,[b] bounded on the west by the Bengal districts of Tiperah and Silhet, and on the east separated from the Birman territories by the river Keenduem. The natives have the soft countenances of the Hindoos, very different from the Birman physiognomy. Several of them who have been taken prisoners are now settled in the Birman capital, Ummerapoora, where they are distinguished by their superior skill in various branches of handicraft work. They are excellent horsemen, and form the only cavalry in the Birman empire. Their music is pleasant, and conformable to the European taste. They profess the Brahminical religion. Their capital is Munipoor, in N. latitude 24° 20′, and E. longitude 94° 30′.[c] The tract in which it is situated forms the nearest communication between the north-east corner of Bengal and the north-west quarter of the Birman empire, but the whole route has not been traversed by any European. A communication is kept up between Munipoor and Assam. It was taken by the Birmans in 1774, and is still tributary to that power.[d e]

[a] Sipon. Elliot. Dr. F. Buchanan.

[b] Muggaloo, in Sanscrit, whence Meckley, a name by which it was formerly known.—M. B.—P.

[c] Munipoor is situated in a valley, extending 60 miles N.—S., by 30 E.—W.; (another account says 30 by 12.) It is surrounded by mountains from 1500 to 2500 feet high. It is separated from Cashar by a range of mountains, occupied by the Nagas, rising in some places more than 4000 feet. Its surface is level, with a few insulated hills. Much of it is marshy. It is not forested. In the S. part is a lake 10 miles long by 7 broad. The country was ravaged by the Birmans, but is now under British protection. The inhabitants resemble the Burmese, but their religion is Hindoo.—*Asiat. Journal.*—P.

[d] The Nagas are a tribe of mountaineers, between the W. part of Cashar and the frontiers of Chittagong. They are a hardy laborious race, much employed as carriers. They transport goods on their backs, in creels or baskets, and many of their women are so employed.—*Asiat. Journal.*—P.

[e] Wade. Syme's Account of an Embassy to the King of Ava.

BOOK XLVIII.

INDOSTAN CONTINUED.

The Deccan, or Southern Indostan.

THE countries topographically described in the preceding book are sometimes called Indostan Proper. To the south of these lies a beautiful triangular region, stretching from a broad base of fifteen degrees of longitude, through a range of the same number of degrees of latitude, that is, from 23° N. to 8°, but gradually becoming narrower as it proceeds southward, till it terminates in a point at Cape Comorin. This portion of India has been called the Peninsula; and, to distinguish it from a country which is to follow it in our descriptions, it has been denominated "the Peninsula on this side of the Ganges." A more appropriate name for it is the Deccan, which, according to some, means *Dakhan*, or "the south," according to others, *Daxine*, or "the country on the right," as it is on the right of those travellers or conquerors who enter by the way of Persia.[a] The term Deccan has not always been equally extensive in its application. In its most ancient acceptation it included the whole peninsula, for it all belongs to the *Poonyabhoomi*, or holy land of the Brahmins. It is full of ancient places of pilgrimage, and has, from the earliest period of history, been inhabited by Hindoos. At the epoch of the composition of the Puranas, it was, like the rest of Indostan, divided into a multitude of small principalities.

The five original nations which inhabit this country go under the common appellation of Draviras.[b] The *Goorjanas*, or Goojers, seem to have been incorporated with the other four by circumstances buried in the darkness of antiquity. Other two, the *Mahrattas* and *Telingas*, have always been numerous and powerful nations, occupying the western and eastern portions of the northern half of the peninsula. On the south, the *Carnatas* or *Canaras* come in contact with them, occupying the whole breadth of the peninsula. The *Tamulas*, or *Draviras* properly so called, dwell in the southern extremity. This division of races, marked by diversity of language and of writing, and consecrated by a religion which prohibits any mixture of caste, has withstood the shock of conquests, the caprices of tyrants, and even the intolerance of Mahometan bigotry. Within the territorial limits of these different races, a certain number of others are found, who have been induced to emigrate to this country by motives of interest, or who have sought in it an asylum from the cruelty of conquerors: but, as they have remained completely insulated, their manners, customs, languages, religious and nuptial ceremonies, bear testimony to their origin, and to the permanent character of all their institutions.

Conquests and political revolutions have occasioned changes in the boundaries and relative importance of the kingdoms which have been formed in this peninsula. The kingdom which in the fifteenth century had Vijanagara, or Bisnagor,[c] for its capital, is more particularly denominated "the kingdom of the Deccan" in the writings of the Portuguese, Arabs, and Turks. It comprehended the more modern provinces of Khandesh, Dowletabad, Bejapoor, Golconda, Berar, and Gundwana. It was also called the kingdom of Narsinga, from a title assumed by its sovereigns. The Mahometan emperors, or Great Moguls, when they conquered a great part of this kingdom, of which Dowletabad was the most conspicuous portion, called it the government or vice-royalty of the Deccan.

This province underwent various changes, sometimes by enlargement and sometimes by curtailment, according to the changing fortune of arms, till at last the viceroy or Nizam of the Deccan, taking advantage of the weakness of his masters to make himself independent, erected a separate state, now subject to England,[d] of which the centre is Hyderabad, and to which, as a state, the name of the Deccan is sometimes particularly applied.

In consequence of these changes, the names of provinces now employed in the geography of the Deccan are sometimes those of the Mogul governments, sometimes those of the indigenous or Mussulman kingdoms, and sometimes those of the ancient tribes. It must be confessed, that these fluctuations give the geographer a troublesome task. Old political divisions are always less important than those now existing, and, from the recency of the last change, existing divisions in the present instance are not defined in a satisfactory manner. But we must trace their leading features. Till very lately we should have been inclined to arrange them under three or four different heads, founded on their political condition, viz. the Mahratta states, the Mahometan possessions, including those of the Nizam and of the Nabob of the Carnatic, the English provinces, and the Hindoo principalities of the south. But recent revolutions have so completely reduced the Mahrattas, and the countries immediately subjected to England are now so thoroughly intermixed with those of the former, as to break up all compactness of territory; the others, likewise, are become so completely subservient, or at least so effectually prevented from numbering the possibility of open defiance among their political prerogatives, that it will be most advisable to follow a simple topographical order, noticing, as we proceed, the

[a] On the right of those who look to the rising sun, (in Indostan Proper.)—M. B.—P.

[b] "The five great nations which inhabit this country are called collectively the five *Draviras*."—M. B.—P.

[c] Bisnagur, or Bijanagur.

[d] Really a subject, but nominally an allied sovereign.—P.

influence of recent events in modifying the present state of the different localities. In prosecution of this plan, we shall first take a view of the Deccan strictly so called, that is the extensive territory which lies between the river Nerbuddah, with its parallel of latitude, extended to the eastern boundary, and the Krishna, and then of the remaining part or triangular termination of the land, lying between the parallel of the Krishna and Cape Comorin.

The Deccan Proper does not enjoy the same advantages for inland navigation as the more northerly provinces already described. The rivers, when swollen by periodical rains, are too impetuous to admit of it, and when not so swollen they are too shallow, except near the sea, where their course is obstructed by sand banks. The roads have at the same time always been impracticable for wheel carriages. Hence, this region is marked by a peculiarity in the mode of conducting an interchange of commodities. These have been transported on bullocks, the property of a class of people named Bunjarries, emigrants from Rajepootana, and consisting chiefly of four tribes, the Rhatores, Burteah, Chowhan, and Powar. In 1813, these were supposed to possess 182,000 head of cattle. Besides these, a race, called Mooltanies, professing the Mussulman religion, who say that they fled from Mooltan when invaded by Nadir Shah in 1739, have a share in the same occupation of carriers, and muster about 5000 or 6000 head of cattle.[a]

We shall take our departure from the central parts in the north; proceed next along the eastern coast, and then take the western provinces in the same order, that is, from north to south.

We begin with the extensive province of Gundwana, so called from the tribe of the Gonds who inhabit the western parts of it, or Gundwana Proper. The eastern parts consist of a number of petty rajah-ships, which are almost independent, and not mutually connected. They are of no political importance, except that they form a strong westerly frontier to Bengal and Orissa, the country being wild, and impenetrable to an army. Gundwana is a large quadrangular territory, with its sides obliquely placed in reference to the points of the compass. On its north-west side it is bounded by Malwah and Allahabad; on the north-east by Bahar and Bengal; on the south-east by Orissa and the Northern Circars, which lie between it and the Bay of Bengal; and on the south-west by Chandesh, Berar, Beeder, and Hyderabad. It contains the sources of the Nerbuddah and Soane: the Wurdee and Godavery form its south-west frontier line, and receive several tributary streams from it. The Karoon, Hatsoo, and Silair, are the largest rivers by which it is intersected, and none of them are navigable within its limits. It is on the whole mountainous, poor, ill watered, unhealthy, wild, and thinly peopled. A chain of mountains of no great elevation extends from the southern frontier of Bengal almost to the Godavery, separating the western or Nagpoor districts from the eastern. The inhabitants of these hills are called Kurns or Carnas. The native Gonds in the west are a miserable race, scarcely advanced one step in civilization, and the very lowest in the scale of Indian society. They are Brahminical Hindoos, the Brahmins having condescended to officiate as spiritual directors to some of their chiefs; but they retain many impure customs, and eat all sorts of animal food, with the exception of beef. One of their chiefs was conquered and taken prisoner to Delhi by one of Aurengzebe's officers, was converted to the Mahometan religion, had his conquered lands restored, and received the title of Boorahan Shah. His descendants were afterwards carried captive to Nagpoor by the Mahrattas. They are still Mahometans, but highly respected, and family alliances with them are ambitiously courted by the other Gond chiefs. All the Gonds have been rendered tributary to the Mahrattas, but the collection of the tribute could never be executed without the presence of an armed force.

The capital of Gundwana is Nagpoor, being the seat of the Bhoonsla Mahratta dynasty. In some maps it is erroneously represented as the capital of Berar, which is an adjoining province. Nagpoor is an extensive city, of modern date, but meanly built. The streets are narrow and filthy, and the houses roofed with tile. It is imperfectly fortified with a wall. The fort is a place of considerable strength. The British residency lies to the west of the city, separated from it by a small ridge of high ground.[b] The city and suburbs are about seven miles in circumference, and the population is estimated at 100,000. This was once a powerful government, but, having so far departed from its old system of reserve and neutrality as to join Sindia in a confederation against the English, it was, in 1803, deprived of Cuttak, and thus cut off from its connection with the sea. Recently, the Rajah Appa Saheb having, under the veil of friendly relations, engaged in a series of deceitful plots, some of which were formed immediately after he had been reinstated in valuable possessions by the conquerors at whose mercy he was placed; that individual was, in 1818, placed in confinement, from which he escaped, and has, by the latest accounts, led the life of a predatory fugitive among the Gonds, while a legitimate heir of the family has been instated in the throne and territory; but the powers of the family are now greatly curtailed, the British having taken possession of all the northern parts situated on the Nerbuddah. Amerkoontook, in N. lat. 22° 55′ and E. long. 82° 7′, is a wild and thinly inhabited region, but a celebrated scene of Hindoo pilgrimage, from containing the sources of the Soane and Nerbuddah rivers. It has not been explored by Europeans; but, being now within the limits of the British dominions, it is likely to be soon better known to geographers. Mundela is a strong fortress on the Nerbuddah, delivered up to the British in 1818. The central district of Chotteesghur is better cultivated than the rest of this desolate province, and exports grain. Its capital, Ruttunpoor, consists of 1000 miserable and straggling huts, near to which is an idol of blue granite, nine feet high, rubbed over with red paint, and ornamented with flowers. Here are many pools and tanks; and the ruins in the neighbourhood indicate the former existence of a more advanced state of society. Ryepoor, another town in the same district, contains 3000 huts.

[a] Mr. W. Hamilton's Description, vol. II. p. 4.

[b] A view of the residency and the adjoining hills is given in Prinsep's Narrative, p. 144 and a plan of the vicinity of the city at p. 230.

On the east of Gundwana, on the Bengal Bay, is the province of Orissa, bounded by Bengal on the north, and the Northern Circars on the south, from which it is separated by the Chilka lake. In the interior the hills are rugged, uncultivated, overgrown by rank jungle, and unhealthy in the highest degree, so that armies have sustained enormous losses by sickness, in the mere act of crossing the mountainous ridge which extends from the Godavery to the Mahanuddy. This province, though provided with so strong a natural barrier, has always easily changed its masters, in consequence of the apathy of the people; and, as its unhealthiness has discouraged colonization, the Hindoo manners are maintained in greater purity here than in most other parts of India. It contains some monuments which seem to indicate that it was a flourishing country previously to the Mahometan invasion, and the conclusion is confirmed by the narratives of some early travellers. Nearly half of it is now under British jurisdiction, including all the low parts on the sea-coast. This part is plain and fertile, but not well cultivated or peopled. Its inhabitants are reckoned a hundred to each square mile.[a] The hilly parts are possessed by native Zemindars, who are called Ghurjauts, and are tributary to the British government. They contain about thirty persons to the square mile. Rice and salt are the chief produce of the province. In the tributary part, the people are wretched and poor. Some live by burning charcoal, or smelting iron, others by felling timber. The country swarms with wild animals, among which are tigers and jackals. In the back lying parts of the province, the native Ooreas, a courageous and fierce race, retain their pristine barbarous manners, and commonly go armed with bows and arrows, or swords, which last are broad at the end and narrow in the middle, and worn naked. An irreconcilable hatred has always subsisted between this people and the Mahrattas. Those Ooreas who are within the British jurisdiction have adopted industrious habits, and are pusillanimous and cunning. In the northern maritime part of Orissa there is a considerable manufacture of coarse calicos, called *sanaes*, for turbans. The sea-port town of Balasore, on the Booree Bellaun river, though much fallen off, having been a great place for European factories at an early period of intercourse between India and Europe, is still noted for maritime transactions. It has at different times been the scene of warlike operations. In 1688, in a dispute with Aurengzebe, it was attacked by the English under Captain Heath, a battery of thirty guns taken, and the town plundered. In 1803, it was taken by the English from the Nagpoor Rajah, and has ever since remained attached to the presidency of Bengal.[b] The district of Cuttak to the south, lying between the Chilka lake and the river Solundee, is a flat, rich, alluvial country. The town of Cuttak is large and populous, and its situation below high water mark, so as to require embankments to preserve it from being inundated by the tide.[c]

In the district of Cuttak, in this province, is the celebrated Juggernaut,[d] in lat. 19° 40′ N. and long. 85° 54′ E. Juggernaut is one of the names of the god Vishnu, under which he is worshipped in various temples in different parts of India. This temple, however, being esteemed supereminent in sanctity, receives the name of Juggernaut by way of eminence. It is a shapeless mass of decayed granite, but conspicuous from a distance, and, on so flat a coast, an excellent landmark for navigators. The town Pooree, by which it is surrounded, is dirty and ill built, inhabited by a sickly Hindoo population, consisting chiefly of priests and officers of the idol.[e] The land for ten miles round the temple is reckoned so holy as to insure future bliss to every person who dies within its bounds. A ridiculous legend is attached to the origin of the image. Krishna, a divine incarnation, was accidentally killed by the arrow of Angada, a hunter, and his bones were placed in the belly of an image made by Viswacarma, the architect of the gods. A succession of different images has been fabricated, and the Brahmins engaged in removing the sacred bones are obliged to bandage their eyes for fear of being struck dead by the effulgence of the relics. The image at present exhibited is a carved block of wood, with a hideous visage painted black, the mouth wide and red, the eyes and head very large, without legs or hands, having only stumps of arms. At ceremonies, he is supplied with gold or silver arms. There are two other idols representing his brother and sister, which are of a white and yellow colour. The cars on which they are elevated are eighty feet high, resembling Hindoo pagodas, supported by strong frames placed on four or five rows of wheels, which deeply indent the ground as they turn. The upper parts of the cars are covered with English broad cloth, in party-coloured stripes, and decorated with streamers. During the festival of Ruth Jattra,[f] the three images are brought forth with prodigious ceremony and noise, and moved along on these machines, amidst the shouts of an immense multitude, from the temple to the garden-house of the idol. The emulation excited to participate in the office of dragging these carriages is very high; the distance is about a mile and a half, but the motion is so slow that the journey occupies three or four days. Horrible scenes often occur on these occasions. Numerous individuals are squeezed or trod to death by the impetuous rushing of the multitude. Many miserable persons die of famine or fatigue round the place, and often at a distance of many miles before they reach the termination of their pilgrimage. Many offer themselves as voluntary sacrifices to gratify the idol. Here superstition assumes a peculiar disgusting form. The temple, throne, and carriage of the deity are covered with indecent sculptures: the motions which are made, and the songs sung by the attending priests and ministers, are grossly obscene, and the highest merit and admiration are attached to the unnatural resolution of suicide, when formed and exe-

[a] Orissa is divided into three natural districts—the marshes or sunderbunds along the coast, the hills and mountains of the interior, and the middle portion, called the Mogulbundi, which is generally level. The two first are under the native Zemindars. The third is under the company's jurisdiction. Its population is 135 per mile, and its revenue 1,264,378 Sicca rupees.—P.

[b] Population of Balasore, 10,000

[c] In the original, "secured by a strong dyke against the rivers Mahanaddy and Katchory." Cuttak stands on an island at the point where the Mahanadi divides into two branches, forming a delta; the northern retaining its name; the southern called the Cajori. It has 6512 houses and 40,000 inhabitants.—P.

[d] Jagatnatha, Sanscrit.

[e] It contains 5,741 houses.

[f] Or *the car*.

cuted by any infatuated individual. When any such announces his intention of resigning life in this revolting manner, the crowd makes way for the devoted individual, who throws himself on the ground before one of the chariot wheels, and is crushed to death. Sometimes, by laying themselves awkwardly down, they are not immediately killed, but languish for an hour or two in the agonies of death. Their bodies are not interred, but left to the dogs and the vultures. The air is deeply infected with the putrid effluvia emitted by the half consumed bodies, and to great distances round the place human bones and skulls lie strewed on the surface of the ground. At the times of the festivals, religious mendicants of all descriptions abound, who employ various strange devices to stimulate the charity of the multitude, such as standing on their heads, filling their eyes with mud, and their mouths with straw, or lying extended in a puddle of water. Numerous offerings of food are made to Juggernaut, and provisions which have been presented by others are purchased with much eagerness, on account of the sacred character which they have thus acquired. One singularity takes place here, that the distinction of caste is forgotten, and all descriptions of pilgrims feast with the Brahmins. Some old persons come on purpose to die at Juggernaut, and many measure the whole distance of a long journey by the length of their bodies.

A great road from Calcutta to Juggernaut has been begun, raised at an average six feet above the level of the country. Between Cuttak and Juggernaut, the branches of the Maha[a] are so numerous, that twenty-seven stone bridges are required. The chief entrance to the town and temple has been widened, to prevent the dismal casualties above alluded to, arising from the rushing of the fanatical crowd on the opening of the gate. This place was taken from the Mahrattas in 1803, and now presents the curious spectacle of a heathen temple of the most exceptionable kind, regulated, and its economy managed, under the British government. Scruples and remonstrances have been made by well meaning individuals on this point.[b] The Europeans certainly give no countenance to the atrocious acts of self-immolation which are perpetrated here under the influence of deluded opinions: but it would neither be wise nor fair to suppress by force the customary expressions of devotion, and the institutions which have for ages been subservient to it; and it would show too much apathy to stand aloof, and leave the scene to its own course, to the full extent of all its attending barbarities. It is better to give full toleration, and at the same time exercise their power to mollify the hideous features of superstition by humane regulations suited to the present state of the general mind, and fitted to impress it gradually with the superiority of liberality and good sense to the fooleries of superstition, and the useless tortures and violations of natural feeling to which it impels its votaries.

In the year 1813, the receipts from the pilgrims (chiefly at the tolls) amounted to 87,159 rupees.

In the year 1813, the accounts of the temple stood as follows:—

Receipts.		Rupees
From pilgrims, chiefly at the tolls,		87,159
From lands assigned to the temple,		20,643
Authorized collections at the temple,		5,997
		113,799
Expenditure.		
Collector's establishment, and contingencies,	17,257	
Value of broad cloth for the idol,	1,505	
Expenses of the temple itself,	56,612	
		75,374
Balance remaining to government,		38,425

The number of taxable pilgrims sometimes amounts to 70 or 80,000; but the number of persons attending exempted from taxation is always much greater. Many offerings are made to this temple all over Indostan, and transmitted either in the form of merchandise or bills of exchange. The economy of the temple is vested in the Rajah of Khoorda, by the British government. It is thought that 1,200,000 persons attend annually of whom a very great number never return.

The province called the Northern Circars includes a great part of the territory which once belonged to Orissa, viz. from Goomsur to the river Godavery. It extends south as far as the river Gundegama. The southern part is subjected to extreme heat in summer, the thermometer sometimes standing at 108° at midnight for an entire week. Under this heat the wood warps to such a degree, that the nails fall out of doors and tables, and glass is liable to crack. The hill fever prevails in the upland parts. Much grain is produced in the Circars. Fruits and esculent roots do not succeed, and are thought to be injured by the sea air. The forests of Rajamundry on the Godavery yield abundance of large teak trees. Several kinds of woollen, cotton, and silk stuffs are manufactured here, but not in remarkable quantity; the thread is prepared by the females. Ships of 500 tons are built at the mouths of the Godavery. The native inhabitants are wholly Hindoos, with the exception of a few Mahometans in the towns. The hilly lands are in the hands of Zemindars, some of whom were driven from the Carnatic and Orissa, by the Mahometans, in 1652. Other lands are divided into villages or townships, a sort of corporations provided with their proper establishment of officers and servants. Under this simple form of government, the inhabitants have lived from time immemorial. The boundaries of villages have been seldom altered, though often injured or desolated, and the same name and the same families have continued for ages. The inhabitants give themselves no trouble about the breaking up of kingdoms while their village and its internal economy remain unchanged. This state of society is prevalent in the whole of southern or peninsular India.

In 1541 this country was subjugated by the Mahometans. In 1724 it was transferred from the house of Timour to the Nizam ul Mulk. In 1742 it was ceded to the French East India Company. It passed into the hands of the British by a grant of the Mogul and the Nizam. A considerable force (six native battalions) is required to preserve this country from the incursions of the mountaineers, whose haunts are not under the control of the British. Ganjam is the most northern

[a] Mahanuddy, Mahanada.

[b] See the details and reasonings in Buchanan's Christian Researches in Asia, p. 18—30; third edition.

district in this province, containing Goomsur, a large zemindary, the possessor of which was found, on accusation and subsequent inquiry by the British magistrate in 1815, to have been guilty of a long series of murders among the females of his seraglio, whom he destroyed by the most inhuman tortures, and threw their bodies into a well where numerous bones were found, demonstrating that the practice had been kept up for many years. To the south of this is Vizagapatam. This district contains the zemindary of Bobilee, the possessor of which, Rangaroo, who ranked as the first poligar in the country, on being taken in his last strong fort by the French commander, at the instigation of a hostile neighbour, in 1757, ordered a thorough massacre of all the women and children of his garrison; and one of the soldiers, out of four who had taken an oath of vengeance when their chief fell, passed through the quarters of his enemy Vizeram Rauze, and stabbed him in thirty-two places. The district of Rajamundry lies along both sides of the Godavery, but the greater part to the south. This is the only country on the west side of the Bengal Bay which furnishes teak wood. There is a considerable cultivation of sugar on the Delta of the river. To the south of this is Masulipatam, famous for its chintzes. The population is industrious and numerous, so that, though the country is rich and well cultivated, it imports considerable quantities of rice and other provisions. To the south of this is Guntoor, a rich and populous district, and the scene of some of the worst excesses of the Pindarees in 1815. Between the 10th and the 22d of March, a band of these miscreants, amounting to 5000, plundered 308 villages, murdered 166 persons, wounded 485, and inflicted torture on 2251. There were eighteen persons who killed themselves in despair on the approach of the banditti. Many of the natives, though unarmed, made a gallant defence, and it was afterwards in contemplation to allow them arms to protect themselves from gangs of robbers; but the precautions since adopted, of utterly destroying the Pindaree combinations, will, it is hoped, form an effectual preventive of any repetition of such scenes.[a]

Having proceeded southward along the eastern coast, a little beyond the Krishna, we shall return to the west boundary of the great province of Gundwana, proceeding here also from north to south, and consequently beginning with the province of Khandesh, which is separated by the Nerbuddah from Malwah on the north, bounded on the west by Guzerat, and on the south by Aurungabad and Berar. The river Tuptee, which runs through it, from east to west, is of considerable size, with deep and steep banks of firm black earth, and sending off numerous ravines on both sides, intersecting the country for several miles. A considerable portion of this province formerly belonged to the Holcar family. It was well peopled and cultivated, but has of late years been ruined by plunder and war. The chiefs of the Bheel tribes possess the hills to the north of Boorhampoor, and, besides their own people, keep some Arabs and others about them, to assist in making forcible exactions on their neighbours. Holcar's dominions here were ceded to the British in 1818. At this time, when the Mahratta power was reduced, the Arab colonies were strong in Khandesh, and it was necessary for the victors to expel them. They made a vigorous resistance, and the only choice allowed to them was transportation to their native Arabian deserts. When they were reduced by force, they escaped this lot in consequence of some misinterpretation which occurred in the course of the negociations. They were allowed to transport themselves wherever they pleased.[b] The Arabs have always made a figure as brave soldiers in this part of India. In the Peshaw's army they received fifteen rupees per month, while the natives of the Deccan only received six, and those of Upper Indostan eight. The forts which made the most determined resistance in 1816, were Mulligaum, which surrendered in consequence of their great magazine having been blown up; Talnere, where the garrison, having acted treacherously under the mask of suing for terms, was put to the sword;[c] and Aseerghur, which surrendered after a vigorous resistance.

Berar is a province nearly of a triangular shape; the north-west side being bounded by Khandesh, the north-east by Nagpoor in Gundwana, which is sometimes erroneously represented as part of Berar, and the south by Aurungabad and Beeder. Its capital is Elichpoor. Berar is an elevated valley, almost equidistant from the west and east coast of the Deccan. It is thinly inhabited, and little cultivated, but some parts of it are naturally fertile, and contain rich grass pastures. The cultivated crops are wheat, maize, pease, and flax. In the beginning of spring a shocking ceremony takes place at Cala Bhairava, in the mountains, between the rivers Tuptee and Nerbuddah. It is the practice of some persons of the lowest tribes in Berar to make vows of suicide, in return for answers which their prayers are believed to have received from their idols. This is the place where such vows are performed in the beginning of spring, when eight or ten victims generally throw themselves from a precipice. The ceremony gives rise to an annual fair, and some trade. But, on the whole, every sort of prosperity has been wretchedly kept down by the lawless spirit of plunder which has been indulged by persons of various descriptions; and the government of the Nizam has had the utmost difficulty in stemming these irregular proceedings, partly in consequence of his own troops, and even his ministers, having been guilty of patronizing the mischief, and sharing in its spoils.

The province of Beeder lies on the south of Berar, bounded by Aurungabad on the west, and by Gundwana and Hyderabad, but chiefly the latter, on the east. The surface is uneven, but not mountainous, and it is in general very fertile. The inhabitants are in the proportion of six Hindoos to one Mahometan, though it has long been subject to Mahometan princes. It is at present included in Nizam's dominions. Beeder, the chief town, was the capital of a Hindoo sovereignty before the Mahometan conquest. It was noted for works of tutenague inlaid with silver. It is much de-

[a] See p. 453, *supra*.

[b] See Prinsep's Narrative of recent Political and Military Transactions in India, p. 415, 416.

[c] See a view of this fort in Prinsep's Narrative, at p. 333.

cayed, but contains the remains of some very good buildings.

To the south and the east of this province is the large province of Hyderabad, extending to the Krishna river on the south, and bounded by the Northern Circars on the east; Gundwana and part of Beeder are conterminous with it on the north. It is an elevated table land, with a hilly surface, and therefore of a lower temperature than the adjoining parts of India. During three months in the year the thermometer is often as low as 45° or even 35°. Woollen blankets, shawls, and quilted silks, are used as a protection from this degree of cold. A few of the principal nobility use English broad cloth as a luxury. The territory is naturally productive, but the cultivators are wretchedly poor, and much oppressed by their superiors. To the south of the capital, an extensive tract, at present desolate and covered with jungle, contains traces of ruined towns and inclosures, which indicate the former existence of a numerous and civilized population. The fiscal arrangements are so bad, that commerce labours under extreme discouragement.

The city of Hyderabad, the capital of the Nizam's dominions, is about four miles long, and three broad within the walls; the streets are narrow, crooked, and ill paved. Its population is reckoned 200,000. The palace and mosques are the only remarkable buildings. The court of Hyderabad retains more of the forms and ceremonies of the old Mogul governments than any other in Indostan. The Nizam possesses large magazines full of the presents which he has, at different times, received from native and European powers, consisting of bales of cloth, cases of glass, china and glass ware, clocks, watches, and similar articles, which are hoarded without being ever seen. The Nizam is a vassal of the British government, but his court has sometimes been a scene of busy intrigue, and the ear of his highness has often been assailed with the suggestions of the enemies of that government, under such circumstances as could not afford the most distant prospect of bettering his situation, and exposed him to the risk of a total loss of his high rank. Some of these intrigues were instigated by Europeans hostile to England, during the late war.

Golconda, to the east of the capital, though renowned for diamond mines, contains none at present, and it is doubtful if it ever did. But the fortress is a considerable depôt for diamonds brought from other parts to be polished and fashioned for sale by the diamond merchants of Golconda. The fortress is used as a state prison, where the obnoxious members of the Nizam's family are confined, in which number are at present included his wife, his mother, and two youngest sons.

Two provinces of the Deccan Proper remain to be mentioned; and both, according to existing divisions, are partly situated on the western shore, though extending a great way inland—Aurungabad, and Bejapoor.

The surface of the province of Aurungabad is very irregular, and in general mountainous toward the western Ghauts. It contains the sources of many rivers, but none of them acquire any considerable size within its limits. Most of it has been long in the possession of the Mahrattas, particularly the sea coast, which has, from that cause, been infamous for piracy. Its capital, Aurungabad, in lat. 19° 54′ N. and long 75° 33′ E. was the favourite residence of Aurengzebe while viceroy of the Deccan. It continued the metropolis of the Nizams till they quitted it for Hyderabad, as being too close upon the Mahratta frontier. Ahmednugger is a fortress in the middle of this province, beautifully situated among the mountains. It has been generally in the hands of a Mahratta chief, sometimes of Sindia, sometimes of the Peshwah. It is populous, and contains elegant architectural remains of Mogul buildings. Dowletabad is a town and strong fortress, seven miles N. W. from the city of Aurungabad, belonging to the Nizam. The fortress is formed of an insulated mass of granite, and the only entrance is an ascent, part of which is a covered way cut through the heart of the rock, so that it can only be taken by famine. It contains within itself reservoirs of water. Not far from this is the village of Ellora, in the neighbourhood of which is found a most astonishing group of Hindoo temples, cut in the solid rock. These contain a sort of pantheon of all the Indian deities. The numberless sculptures, friezes, columns, and chapels, apparently suspended in the air, display, every where, a great refinement of taste united to labour inconceivable. The symbols seem to have been formed partly by Brahminical and partly by Buddhist devotees. At present they are not held in any veneration, nor visited by any class of pilgrims; but being in the neighbourhood of Dowletabad, which was in ancient times the seat of a powerful Hindoo principality under the name of Deoghir, they probably owe their origin to the zeal of the reigning families of that metropolis. The village and its lands being now transferred to the British government, we wait for a more complete account of the symbols and inscriptions, as none has hitherto been given by any competent scholar.

To this province belongs the Island of Bombay, the seat of the principal British settlement on the west coast of India, in lat. 18° 56′ N. and long. 72° 57′ E. This small island is formed by two parallel ranges of whinstone rock, one on the west, five miles long, and another on the east, eight miles long. These rocks are united at each end by a low belt of land, which seems to be of recent formation, and over which the sea is said sometimes to have broken, and flooded 40,000 acres of land. The Goper river, belonging to the island of Salsette, and which runs into the channel, separating this island from Bombay, is said to have occasioned similar inundations, and flowed quite across Bombay island into the ocean at its southern side. When first noticed by Europeans, Bombay was reckoned a most unhealthy place. It contained a cocoa nut wood.—The fortifications of this island are thought too extensive, as requiring too numerous a garrison. The houses are built of wooden pillars, supporting wooden verandas. The view of the bay from the fort is extremely beautiful. Bombay is a barren rock, unfit for agriculture; but possesses great advantages for trade and for ship-building, the rise of the tides being sufficient to permit the construction of docks on a large scale. The docks belong to the Company, but the

persons who contract for the timber, the inspector on delivery, and the builders of vessels, are always Parsees, who monopolize every department, and build many large vessels, some of 1000 tons. The teak wood of which they are built is brought from the western side of the Ghaut mountains. The Parsees are exceedingly thriving, and contribute much to the prosperity of the settlement. This little island commands the whole trade of the north-west coast of India, and of the Persian Gulph. In 1814 the Company's marine at Bombay consisted of eighteen armed cruizers, besides armed boats, advice boats, and other craft, a force requisite on account of the swarms of cunning and ferocious pirates by whom these seas are infested. In 1716 the population was 16,000; in 1816 it amounted to 161,000. The European society at Bombay is less numerous than at the other two presidencies, and the salaries of the functionaries are smaller, consequently there is less profusion, although great abundance and even elegance, in their mode of living. The territorial possessions under the immediate jurisdiction of the Bombay presidency are small compared to those of Bengal and Madras, and lie chiefly along the Gulph of Cambay; but the inhabitants are among the most intelligent and industrious of Indostan, and carry on a very great trade. Very few capital condemnations occur in the criminal court, sometimes not one in six years.—Twenty days are required to convey a letter by post from Calcutta to Bombay. A telegraphic communication was once projected, but not carried into execution. It was apprehended that the stations in the interior might be exposed to the attacks of plunderers for the sake of concealing their own motions. The small town of Mahim, on this island, has a Portuguese church, to which a college for priests is attached, but their chief seminary is at Goa, where all attend who have any pretensions to learning.

The comparatively large island of Salsette, on the north of Bombay, was formerly separated from it by a narrow strait, but they are now connected by a narrow causeway. The length of the island is eighteen miles, and its breadth thirteen. The soil is fertile, and well adapted to the production of the most valuable articles; yet it unaccountably remains uncultivated, and covered with jungle, which makes it more unhealthy in its present state than Bombay. Some attention has lately been paid to the formation of roads, which, along with the causeway, have a natural tendency to introduce other improvements. The causeway gives great facility to the gardeners in bringing their produce to the Bombay market, but it is said to have injured the harbour. The operation of embankments in producing either depositions from the stagnation of the water at a particular spot from the meeting of opposite currents, or the contrary effect of an active current, attended by the deepening of a moveable bottom, is seldom foreseen with such precision as to afford certain practical rules on this point of engineering. That this island, at some period buried in the obscurity of early history, has enjoyed high prosperity, is attested by the remains of former great works found on it, such as tanks and terraces, accompanied with flights of steps. It is also rich in mythological antiquities. There are several extraordinary caverns in it, one of which resembles that at Carli on the adjoining part of the continent, and contains two gigantic figures of Buddah, twenty feet high, showing that the works belonged not to the Brahminical, but the Buddhist system of faith. The Portuguese converted the place into a Christian church. They did not destroy the images as in many other instances; but, not having coolness enough to allow them to stand as simple monuments of art and of antiquated opinions, they converted them into Christian emblems, painted them red, and, with pious zeal, cherished them as valuable proselytes; many others, of an ugliness incorrigibly heathen, they utterly effaced. Considerable quantities of bay salt are made here in the shallows along the shore.—The island is estimated to contain 50,000 inhabitants, one fifth of whom are Christians, partly descendants of the Portuguese, partly a sort of converted Hindoos. The inhabitants are altogether an orderly race; a criminal trial does not occur amongst them for years; drunken quarrels and petty assaults being the utmost extent of their breaches of the peace. Here, as in Bombay, several Indian languages, together with English and Portuguese, are spoken with almost equal frequency, and writings on business are drawn up in all of them. On this island are the town and fortress of Tanna, the latter commanding the passage between the island and the continent. It was taken from the Mahrattas in 1773.

Elephanta is a beautiful island in this group, about seven miles from Bombay, and five from the continent; composed of two long hills with a narrow valley between them, and is nearly six miles in circumference. At the landing place there was formerly an ill-shaped colossal statue of an elephant, cut out of a solid rock, which has now, in a great measure, fallen to pieces by its own weight. It was from this statue that the Portuguese gave the island its present name. This island contains the most celebrated of those artificial caverns which bear witness to the influence of superstition in animating its votaries to execute the most astonishing labours. The entrance is fifty-five feet wide, its height and length about eighteen.

The temple itself is 130 feet long, and 123 feet wide; its height varies from $17\frac{1}{2}$ to 15 feet; it is supported by twenty-six massy columns, cut out of the solid rock; the interior is covered with sculptures which differ from those of Kennery in Salsette, in being Brahminical. These have suffered severely from the assaults of the Portuguese. The most remarkable figure is a bust with three heads, called the Trimurti; the middle head representing Brahma the creator; and the other two Vishnu the preserver, and Siva the destroyer. Such are the leading capacities in which the character of the Deity is contemplated. These sometimes appear to be three representations of one Being, at other times the worshippers view them as distinct persons, according to the varying conceptions of a vague metaphysical theology. The length from the chin to the crown of the head is six feet; and the countenances would be remarkably beautiful were it not for an inordinate thickness in the under lip.[a] No document whatever exists to lead to any probable conjecture regarding the period

[a] Maria Graham's Journal of a Residence in India, p. 55, &c.

at which this temple was formed, or the individuals to whom it owes its existence.

Between Bombay and the main land, and separated from the latter by a very narrow strait, is Caranja, or Oorun isle, to which convicts are sent from Bombay to be employed in public works. A great quantity of salt is manufactured here, yielding a revenue to government of 11,000 rupees, (L.1100.)

About fifteen miles south from Bombay are the small islands Henry and Kenery, both fortified, and formerly a great resort of pirates. Four miles farther south are Colabba isle and Colwoman's island, which are esteemed well adapted for the accommodation of European troops on account of their great salubrity, and the facility with which intemperance among the military may be prevented, and though not hitherto so employed, seem to be reserved for that purpose, as they are not applied to any object of revenue.

Returning to the continental territory of the province of Aurungabad, we find the large district of Baglana, one of the original Mahratta countries from whence that tribe first sprung into notice. Its Rajahs yielded a sort of feudal obedience to Aurengzebe, and a tribute which was not regularly paid, its subjugation never having been complete. This country was among the first to throw off its nominal subjection to the emperor of Delhi, under the conduct of Sevajee the first Mahratta leader, and it remained under a Mahratta government till 1818. It is exceedingly mountainous, and owed its habitual independence to its natural strength. Sungumnere is another large district, subject to the Peshwah, before the late extinction of the power of that family. The districts of Jalnapoor, Bheer, and Futtehabad, belong to the Nizam. That of Jooneer contains Poonah, the late capital of the Peshwah.[a]

In the ancient tables of the Hindoos the term Maharashtra[b] is given to a division of the Deccan, chiefly in the north-west quarter. Khandesh, Baglana, and part of Berar, were included in the original country of the Mahrattas,[c] extending north-west as far as Guzerat and the Nerbuddah, where the Grassias and Bheels commence. The Mahrattas were leagued with the pirates of the western shore, and bore with them the common name of Ganim, or robbers.[d] The Mahratta language is now diffused much more extensively. This people is not, like the Rajepoots, originally of the military cast. They are divided into three principal tribes; the Koonbee, or farmers; the Dungar, or shepherds; and Goalah, or cowherds. Their make is diminutive, and has nothing of the grace and dignity of the Rajepoot. It is only in very modern times that this nation has attracted notice, being unknown in history from the time of the Mahometan conquest till the reign of Aurengzebe. They were governed by a plurality of discordant chiefs, till their efforts were combined under the adventurer Sevajee, the illegitimate offspring of the Odeypoor family. After various adventures, he settled at Poonah, where he died. One of his descendants delegated all his authority to a Brahmin, who afterwards assumed the sole power, under the title of Peshwah, fixing his residence at Poonah, and making a mere pageant of the representative of the royal stock, viz. the Rajah of Satarah, whom he kept in his possession. In the mean time Bhoonsla, the paymaster, seized the eastern portion of the empire, and fixed his seat of government at Nagpoor. The family of Sindia established itself in Malwah and Khandesh, and seized a great part of Rajepootana. Guicowar seized a great part of Guzerat; and Holcar part of Malwah. These chiefs were always disposed to act in a confederate capacity; and each divided his conquests among the others. Their possessions were thus very much mixed; the same district, or even the same town, being often held by a plurality of chiefs, each with separate rights. Their more remote possessions used to contain no larger number of genuine Mahrattas in proportion to the natives than India now does of English to Indians; and in later times the countries were kept in subjection chiefly through the instrumentality of Europeans, whose tactics were opposed to the physical force of the Hindoos and Mahometans.

Making a constant trade of war, the Mahrattas could at any time raise a numerous cavalry, though badly maintained and irregularly paid. This army was joined by Mussulmans, Hindoos, Rajepoots,[e] and latterly by the Pindarees, all of whom conceived it their right to make up for the want of regular pay by ravaging the countries of the conquered. "A Mahratta camp," says Tone, "is formed without any regard to regularity, and always occupies a great extent of ground. When the prince's tent is fixed, the great bazar is established in front of it, and there all sorts of goods are exposed for sale. This bazar constitutes a considerable source of revenue to the prince; every merchant and every tradesman belonging to it pays a duty of about five rupees per month. The dancing women, who follow the camp in hundreds, are also liable to a regular tax, and even the pickpockets, a great number of whom follow the army under the protection of the prince. The cavalry make very long marches, and endure great fatigue. They sometimes give opium to their horses, to carry them through their fatigues." This people, while extending their ravages and their conquests, met with a severe and bloody check at the battle of Paniput in 1761, when they were overthrown by Ahmed Shah Abdallah, the Afghân sovereign. In 1795 they confederated to invade the dominions of the Nizam, an expedition which turned out a mere marauding incursion, but before and after this they were much divided, and were engaged in warring against one another. The forces of Sindia and the Peshwah met with a signal defeat from Holcar near Poonah, in 1802. The Peshwah, Baje-Row, in consequence of this event, fled to Bassein near Salsette, where a treaty was entered into between him and the British, and he was in a few months after reinstated at Poonah by General Wellesley (now the Duke of Wellington.) This state, however, like the others belonging to the Mahrattas, was miserably ill-governed; oppression, extortion, rapacity, embezzlement, and discontent, were every where prevalent. All the offices at the court of Poonah were hereditary. Not

[a] Paishwah.
[b] Maha-Rashtra, great robber. M. B.—P.
[c] Orme's Indostan.
[d] Anquetil, Oupnekhat, II. 774.
[e] "This army did not consist entirely of Mahrattas, but was joined by Mussulmans and Hindoos, particularly Rajepoots." M. B.—P.

only did the people suffer, and industry consequently languish, but the members of the government perpetually preyed openly or secretly on one another, and on the general interests. A Mahratta government always considered itself as at war. At the festival called Dusserah, in the end of September, after the breaking up of the rains, they used to prepare regularly for their expeditions. The only weapon used by the horsemen is a sabre, in the use of which, and the management of their horses, they are extremely dexterous. The principal functionaries of a Mahratta state were Brahmins: they were the only individuals who had it in their power to accumulate wealth, and they are remarkably well qualified for public business, by their extraordinary urbanity and command of temper. A Brahmin, however, after being allowed to fill his coffers for years, generally fell at last under the grasp of his rapacious prince. The countries overrun by the Mahrattas have been much depopulated, and filled with misery. "I do not believe," says Tone, "that a government can be mentioned on the face of the earth less capable of protecting its subjects than the vague and uncertain system of the Mahrattas, nor an administration more rapacious, more corrupt, less stable, and less fitted to provide for the happiness of individuals, and the tranquility of the state. To this are to be ascribed the extreme misery of the people, the oppression, poverty, and famine which they suffer, and to which this unhappy country seems to be devoted."[a] The restlessness of the Peshwah, (which might be called perverse, if we were not obliged to acknowledge that an impatience of subjection and control is universal among those who have ever tasted the sweets of independent rule, but which, in this instance, exhibited a strong contrast to the indulgence received,) hastened the downfal of the Mahratta power. In 1815 that chief was detected plotting, in direct violation of recent treaties which he had made with the English, not only when at their mercy, but when they had saved him from falling a victim to the hostility of his own brother chiefs. His first flagrant act was the murder of the Guicowar's ambassador, through the agency of Trimbukjee Dainglia, his minister. In consequence of this act his capital was surrounded, and he was obliged to fulfil the article of a former agreement, of keeping up an auxiliary force of 5000 cavalry, and to give up certain districts for maintaining it. After this, trusting to the co-operation of Sindia, Holcar, and others, he declared open war, by attacking the British residency at Poonah. Defeated in this attempt, he was reduced to the situation of a wandering fugitive with his army, was at last taken, obliged to renounce all sovereignty for himself and his family, and sent to reside in exile at Pithoor, a place of Hindoo pilgrimage in the province of Allahabad. The greater part of his territories were taken under the immediate rule of the British authorities. The Rajah of Satarah was established in his sovereignty, and had some additional territory assigned him from that of the Ex-Peshwah. This arrangement reconciled the military class of the nation; the full maintenance of the religious establishments, and the preservation of their sources of revenue, quieted the religious orders; and the cultivating and mercantile classes spontaneously hailed the revolution as the first dawn of their freedom and prosperity.

The city of Poonah, the former residence of the Peshwah, is in lat. 18° 30′ N. and long. 74° 2′ E.; 100 miles from Bombay, and seventy-five from the nearest part of the coast. It is indifferently built, open and defenceless, and occupies only two square miles of surface. Several of the houses are large, and built of square blocks of granite to a height of six feet, above which there is a frame of timber with slight walls. The streets are named after mythological personages, and the walls of the houses painted with figures of the gods, forming thus a spacious pantheon, where the history of the Brahminical deities may be studied in traversing the streets. The ancient palace is surrounded by high thick walls, and was inhabited by the Peshwah's brother, and the other members of his family, while he himself lived in a modern house in a different part of the town. He had made arrangements for building a new palace, to be executed by British architects, and the ground was regularly consecrated by being plastered over with ashes and cow-dung. To the east of the city there are excavations with mythological sculptures of the same kind with those of Elephanta, but much inferior. The Moota Moola river, which flows past this city, afterwards joins the Beema, a tributary of the Krishna, and during the rainy season a journey may be accomplished by water in a light canoe all the way from Poonah to the Bay of Bengal. The population has recently increased; it is now estimated at 150,000. The British residency is about two miles from Poonah.

Thirty miles N. W. from this city are the remarkable excavations of Carli, sculptured over, not with Brahminical figures like those of Elephanta, but with emblems of the Buddhist or of the Jain religion, *i. e.* figures of elephants, of men, and of Buddha, and these are confined to the capitals of the pillars; there are no personifications of the deity, and no separate cells for sacred rites. The cave is highly magnificent. It has elegant hexagonal columns, supporting a roof ribbed with teak wood cut so as to fit the cave exactly. The portico is highly laboured, and contains some figures remarkable for gracefulness of design.[b] Four miles from Carli is the remarkably strong hill-fort of Loghur.

About ten miles west from Poonah, at Chinchoor, a personage resides, who, like the great Lama, is venerated as an incarnation of the favourite Brahminical deity, Ganesa or Gonputty, the god of prudence. He lives in a large dirty pile of building, accompanied by many Brahmins, who subsist on the revenue of the land which has been appropriated to the establishment by the bounty of superstitious neighbours. When Mrs. Graham visited the place in 1809, the existing Deo of Chinchoor was a boy of twelve years of age. This person worships his other self in the form of a statue, that other self being the greatest of the two, and not impaired by incarnation.[c]

South from Aurungabad is the large province of Be-

[a] Tone, Sketch of the Political Constitution of the Mahratta Government, translated in the "Annales des Voyages," V. Chambers on the Mahrattas, in the Asiatic Researches.

[b] Maria Graham's Journal of a Residence in India, p 64. This work contains a plate of the cavern, and another of the portico.

[c] Ibid, p. 70.

japoor, extending as far south as the river Tomboodra, the great southern tributary of the Krishna. The maritime parts of it, lying between the Ghaut mountains and the sea, go under the general name of the Concan; the remainder is the basin of the Krishna and its tributaries, the Beema and Gutpurba. The horses reared on the banks of the Beema are held in great estimation by the Mahrattas. In this province the style of building among the lower classes undergoes a perceptible change: the roofs to the north of the Krishna are pitched and thatched; those on the south are flat, and covered with mud and clay. This whole province was, during the Peshwah's power, exposed to dreadful disorder and depopulation, in consequence of the projects of rapine and oppression which that prince indulged against the leading families, till at last, in 1804, tranquillity and a more steady arrangement were established by British arbitration.

The city of Bejapoor, written Visiapoor in old European books of travels, seems to have been a very extensive place when it was the capital of an independent sovereignty, and before it was taken by Aurengzebe in 1689; and the fort was one of the largest in the world. At present it exhibits scarcely any thing but shapeless heaps of ruins, attesting its ancient magnitude. The fort, measured by the counterscarp of the ditch, is about eight miles in circumference. The flanking towers are numerous and of great size, and the ditch cut out of the solid rock. Here are some magnificent ruins of the tombs of Mahometan saints. Most of the buildings, excepting the palaces in the fort, appear to have had little or no wood used in their construction. They are generally built of massy stone, in the most durable style, the workmanship being at the same time minute and elegant. The city is said to have contained amazing wealth; and many valuables, and quantities of the precious metals, are often found among the ruins. Twelve huge guns are still left, affording a specimen suited to the enormous size of the fort itself.

That part of this province which is called the Concan declines gradually westward from the Ghauts to the sea, and contains many streams, but no large river. This coast being elevated, and broken into small bays and harbours, was particularly favourable to piracy, and went by the name of the pirate coast. Much of it is rich. It produces remarkably strong hemp, but the plant will scarcely bear any seed. In 1816, the Concan, and the whole maritime country from the 17th to the 21st degree of latitude, were scoured by a marauding leader of the Pindarees, called Sheik Dullo. This coast contains several places of note.

Beginning at its northern extremity, we find Fort Victoria on a lofty hill near the entrance of the Bancoot river. In 1756 it was a piratical state, and was taken by Commodore James, in concert with the Mahrattas, and ceded to the British along with its district, consisting of nine villages, in exchange for Gheria. It became extremely populous in consequence of the security which property enjoyed within its limits, and would have been much more so if there had been an adequate supply of water. The fortress of Gheria, situated on a rocky promontory connected with the continent by a narrow neck of land, is in lat. 17° 56′.[a] In 1707, Conajee Angria had established here an independent sovereignty, and possessed a numerous piratical fleet. The place was taken in 1756 by Admiral Watson and Col. Clive, and the fleet destroyed. There were found in it 200 pieces of cannon, and moveable property to the extent of L.120,000. The island of Dewghur on this coast, in 16° 21′, commands a very fine harbour, where vessels of 600 tons may ride in safety during the whole monsoons. Between the British possessions in Malwan and the Portuguese district of Goa, is the principality of Warree, the chief of which is called the Bhoonsla. This was the piratical state longest tolerated by the Bombay government, being only kept in check by a blockading squadron. Deadly animosities subsisted between the Bhoonsla and the Rajah of Colapoor, by which the whole territory was kept in a state of desolation and misery. Warree surrendered to Col. Keir in 1818. The fortified island and town of Malwan, in lat. 15° 53′ N. thirty-three miles from Goa, were acquired by the British from the Rajah of Colapoor in 1813, and Vingorla, in its neighbourhood, from the Ranny of Sawant Warree, along with a certain extent of territory, for the purpose of suppressing piracy.

The city of Goa, in the southern part of the Concan, is a place of great note, being the metropolis of the Portuguese possessions in India, in lat. 15° 30′, two hundred and fifty miles south-south-east from Bombay It is situated on the river Goa, or Mantoa, which flows from the Ghauts into the Gulph of Goa, by several mouths, forming the peninsula of Bardess and the islands of Goa, Combarem, and others. The old city of Goa is eight miles up the river, and now deserted by the secular inhabitants on account of its unhealthiness. The natives call this city *Tissoari* or *Trikurii*.[b] According to the traditions of the country, the island was peopled by a colony of Moorish merchants driven from the different ports of Malabar; but it was a commercial place at a much earlier period. It contains many magnificent churches, in a style of architecture excelling any thing done by Europeans in other parts of India. New Goa is at the mouth of the river within the forts of the harbour. In 1808, there were 200 churches in the Goa province, and above 2000 priests. The territory still possessed by the Portuguese in this quarter is 100 miles long and 20 broad. Goa was taken from the Hindoo Rajahs by the Bhamenee Mahometans about A. D. 1469. In 1510 it was taken by Albuquerque, and made the capital of the Portuguese possessions. That nation does not seem to have taken possession of much territory, but merely made India an object of pillage, on which they maintained a large European army. In 1580 they possessed, on this coast, Diu, Damaun, Choul, Bassein, Salsette, Bombay, and Goa. They had factories at several other stations, where they influenced the respective governments. After the conquest of Portugal by Philip II. of Spain, in 1580, the Portuguese settlements were neglected, and left to their own resources; and the vices of their internal government, and the exorbitant power of the inhabitants, hastened their decay.

[a] In 16° 31′, (Ed. Encyc.)

[b] Tiefenthaler, I. 364. Pennant, II. 110.

At present, with the exception of a few of the highest classes, the great mass of the Portuguese population in India consists of descendants of Europeans by native women, and numerous converts who have joined them, and who still retain many Pagan customs. At present the Portuguese nation possesses only Diu, Damaun, Goa, Dhelli on the island of Timor, and Macao in China. Goa is the seat of an archbishop, a viceroy, a chancellor, with several other great functionaries, and a tribunal of the inquisition.

The small state of Colapoor is partly in the Concan, and partly within the Ghauts. Its capital is in lat. 16° 19′. It has been in modern times a scene of habitual confusion, like most other Mahratta states. Parnella, in its neighbourhood, is reckoned the most healthy district in the Mahratta dominions.

Satarah, in the northern part of this province, is a remarkable place, as being the residence of the royal family to which the Peshwah yielded a nominal submission, whilst he kept it under his own power, and used the Rajah as a mere pageant. When a new Peshwah succeeded to power, he repaired to Satarah to receive the keelaut, or dress of investment. The country round Satarah was privileged with exemption from military depredations. When the Peshwah was reduced and obliged to abdicate in 1818, part of his territory was allotted to form a dependent sovereignty for the Rajah of Satarah, while the rest was incorporated with the former British conquests. This sovereignty is bounded by the Ghauts on the west, by the Neera and Beema on the north, by the Warnah and Krishna on the south, and by the Nizam's dominions on the east. The net resources of the Rajah amount to fifteen or sixteen lacks of rupees. The country is in the interim occupied by the British authorities till it becomes duly tranquillized, and till the Rajah, who is a young man, becomes adequate to the duties of his situation.[a]

At a distance of thirty miles S.S.W. from Satarah, is the fortress of Wassotah, in the midst of the finest and most magnificent scenery. It was besieged and taken in 1818. Punderpoor, on the Beema, is a regular, well-built, populous, and thriving city, where almost all the chiefs of the Mahratta empire had dwellings. The first stories of the houses are of stone, and the second of brick. This has received some celebrity as the scene of the assassination of Gungadhur Shastry, the ambassador of Guicowar, by persons hired by the Peshwah and his minister Trimbukjee. The person slain was a high Brahmin, and the foul act was perpetrated during the solemnities of religion, while myriads of pilgrims were collected in the city. It proved the source of all the subsequent misfortunes and final overthrow of the Peshwah.—Darwar, a fortified town, was ceded by the Mahrattas to Tippoo in 1784. In 1790 it surrendered to the Mahrattas, assisted by the British, after a siege of twenty-nine weeks, when the town was almost destroyed, and the country totally devastated. It is now, with the adjacent district, attached to the presidency of Madras.—Badaumy, fifty-five miles east from Darwar, on the river, is one of the strongest hill-forts in India. It was taken by storm in 1818. Hoobly, thirteen miles from Darwar, is a populous and respectable mart, containing numerous and rich bankers, who regulate the currency of the neighbouring country. The surrounding country is well wooded and watered. Shahnoor, near the Tomboodra, was once the capital of a small Patan state. It was dreadfully demolished, and the country ravaged by Tippoo. Copâl, at a lower part of the Tomboodra, was taken by storm by an English detachment in 1819.

Twenty miles east from this is Bijanagur, a Hindoo city of great antiquity and celebrity. Its wall is eight miles in circumference. It was the capital of the kingdom called Narsinga or Bisnagur in old European maps, which comprehended the whole Carnatic above and below the Ghauts. This capital is described in glowing colours by the eastern writers,[b] and half a century ago it still presented some remnants of its ancient splendour.[c] It was founded in 1344, and must not be confounded with another Bijenagur or Visianagur, founded in 340, on the confines of Khandesh and Malwah.[d] The descendant of the Narsinga monarchs possesses, under the title of Rajil, or little Rajah, the fort of Anagundy, one of the ruins of the city of Bijanagur, with a small revenue.[e]

The southernmost portion of continental India still remains to be described. The river Krishna is mentioned in a general way as its northern boundary, which it actually is at one part; the province of Hyderabad, being on the north, and the Balaghaut on the south side of that river: but the upper part of the Krishna flows within the province of Bejapoor. The geographer, therefore in the western part, takes for the boundary an important tributary of the Krishna, farther south, called the Tomboodra. The Krishna, in like manner, before it empties itself into the bay of Bengal, winds round to the north, on which account a considerable part of the Circars, already described, lies on the south of the river; and here we take for our boundary, a small river called the Gundegama. The territory which has this line formed by the Tomboodra, Krishna, and Gundegama, for its boundary on the north, and the sea in all other directions, terminating in Cape Comorin in the south, has a triangular form. Physically viewed, it consists of a great central table land, (principally occupied by the Balaghaut districts, and the Mysore,) separated by abrupt and mountainous declivities from a low belt, various in breadth, lying between it and the sea on the west and east. The term Balaghaut, signifying, above the Ghauts, is often applied to the whole central eminence, while the low belt is called Payeen Ghaut, or, below the Ghauts. In this whole country the number of Mahometans is comparatively small; consequently the primitive Hindoo manners and customs are preserved more entire than in other parts of India; a circumstance promoted by the insulated state in which all strangers who have taken up their residence in these regions have remained. It contains, besides the followers of

[a] Narrative of the Political and Military Transactions of British India, under the administration of the Marquis of Hastings, by Henry T. Prinsep, 4to. 1820. p. 419, 420, &c.

[b] Abdool Rizacq, Voyage dans l'Inde, edition de M. Langlès, ch. 4. et note 36. Khondemir, in the Asiatic Ann. Register, 1800. Misc. Tracts, p. 226.

[c] Tiefenthaler, I. p. 369.

[d] Wahl, II. 956, &c.

[e] 500,000 or 600,000 francs.—M. B.

the Brahminical system, which are the most numerous inhabitants, many Jains, some colonies of Jews settled in Cochin and other parts of Malabar, and many Christians of different denominations. In its present political situation this whole territory is included in the presidency of Madras.

The term Karnata was applied to an ancient Hindoo geographical division, comprehending all the high table land; but it has in modern times lost its original application, and has been transferred to the adjacent provinces on the sea-coast. These are still, for the sake of distinction, called by some the Lower Carnatic. The soil of this country is in general light and sandy, sometimes inundated with torrents of rain, at other times burned up by the land winds,[a] impregnated with fine dust; it produces tobacco, betel, indigo, *holcus sorghum*, and dourra. Rice is less abundant than in many other provinces. Agriculture depends on artificial canals and reservoirs, built at an enormous expense by the princes and heads of villages. The basin of Saragambra, among others, is eight English miles in length, and three in width, and for eighteen months supplies thirty-two villages with the water required for cultivation. The sea-coast is so shallow, that flat-bottomed boats[b] are required for landing; yet manufactures and trade have attracted the Europeans to this coast, so little favoured by nature. The inland parts contain hills of sienite, with a small proportion of feldspar; and the soil of the flat country seems to consist of the debris of the same rock. The loamy part of the soil is often strongly impregnated with iron. It is also impregnated in many places with common salt. This is the case near Madras, where the soil is heavy but sterile, and at certain depths contains strata of cockle and oyster shells at a distance of nine miles from the sea. Here trees will not thrive. The only trees which grow spontaneously on the barren parts of the Carnatic are the *Melia azedarach*, or common bead-tree, and the *Robinia mitis*.

In the towns and villages, and along some of the principal roads, are choultries for the accommodation of travellers. The small ones are single square rooms, without windows; the larger ones are handsome and extensive buildings, erected by munificent or pious individuals. A Brahmin always resides near, who furnishes the traveller with food and a mat to lie on, and they are provided with a tank or well, where the pilgrims perform their ablutions. These establishments abound for forty or fifty miles round Madras: but they are kept in a dirty state, and the water of the ponds is very impure from neglect. The Carnatic abounds in temples or pagodas, which here are always within an area, surrounded by a wall as high as the temple itself. Over the gate-way is a high tower, serving as a historical monument of the god to whom it is dedicated. It contained formerly a prodigious number of forts, which, from the long continuance of internal tranquillity, are now going to decay. The population is estimated at five millions. The Mahometans are very thinly scattered over the country, excepting at the Nabob's court. The number of Christians is reckoned at 40,000, one half of whom are Roman Catholics. The natives are generally much inferior in bodily vigour to the inhabitants of northern Indostan. Here many of the Brahmins follow secular professions.

The most brilliant and interesting place in this province, at the present day, is the seat of the presidency, MADRAS. On approaching this city from the sea, the flat sandy shores and low hills present an appearance of barrenness which wears off when we come nearer, and find such crowds of human beings covering the beach. The public buildings present an elegant appearance, having colonnades to the upper stories, supported on arched bases, and covered with the beautiful shell mortar of the country, called chunam, which is hard, and so finely polished as to have exactly the appearance of marble. The fortifications of Fort George, and the pagodas and minarets, at a little distance, mixed with trees and gardens, give an air of magnificence to the scene.[c] The station, however, is extremely unfavourable for a capital. A rapid current runs along the coast, and a powerful surf beats even in mild weather. Pondicherry would have been a far more eligible situation, lying to windward, and placed in a fertile country. Some local contrivances have been adopted here for surmounting the disadvantages of the landing. Large and light boats are used for crossing the surf. They are formed of thin planks sewed together, with straw in the seams instead of caulking; the great object in their construction being flexibility. The ships' boats sometimes anchor on the outside of the surf, where they wait for the country boats from the beach. When the unsettled state of the weather renders landing dangerous, a flag is displayed on shore to warn the sailors. A sort of loose raft, called a catamaran, is often used in bad weather for maintaining communication between the shore and vessels at anchor. The catamaran-men wear a peculiar cap made of matting, in which they can keep any letter intrusted to them quite safe, although they themselves should be washed off the raft, a circumstance which often happens, and is not much minded, as they find it easy to regain their situation by swimming. Madras differs from Calcutta in having no extended European town, except a few houses in the fort, as the settlers here live entirely in their villas, and merely repair to the fort to transact business. Fort George, though not so large as Fort William at Calcutta, is handsome and strong; it requires but a moderate garrison; is on commanding ground, and easily relieved by sea. The garrison consists of one European regiment and four native battalions. In the middle stands the original fortress, now converted into government offices and town houses for some of the civil servants. Here are also the church, the governor's house, and the exchange, on which a lighthouse is erected, the light of which is ninety feet above the sea, and seen at a distance of seventeen miles. The government house is on the edge of the esplanade in the choultry plain, a large and handsome edifice; near to it is the residence of the Nabob of the Carnatic, called the Chapauk gardens. The villas or garden houses are only one story high, of a pleasing architecture, with porticos and verandas, supported by chunamed pillars, and surrounded by trees and shrubs; the floors are covered

[a] "Terrenos." [b] "Chelingues."

[c] Hodge's Travels in India, p. 2, 3, &c.

with rattan mats. During the hot winds the air is kept cool by mats formed of the roots of the fragrant cusa grass, which are placed against the doors and windows, and kept constantly wet; through these the draughts of wind are transmitted which serve to ventilate the apartment. Whenever the use of these is intermitted, the sensation produced is like that of a furnace. Yet there is on an average less extreme heat here than at Calcutta. The botanic garden, which was fitted up at a vast expense, was almost destroyed by a hurricane in 1807. The roads in the immediate vicinity are broad, well made, and agreeably ornamented with trees. The huts are roofed with tile, and present a better appearance than those of Bengal. The society of Madras is not so extensive as that of Calcutta; provisions are less abundant and more expensive. The style of living, however, is nearly the same. The Mount road is a favourite resort, where the ladies and gentlemen repair with their gayest equipages. Along this road banyan and white tulip trees are planted on each side. On this road, at a distance of five miles from Fort St. George, is a cenotaph to the memory of the Marquis Cornwallis, where the gentry drive slowly about and converse in the cool of the evening. In this city there are two orphan hospitals, a male and a female, both admirably conducted. Madras is visited by French pedlars from Pondicherry, selling laces and artificial flowers; and a few Mahometans go about selling amber, mocha stones, coral, and other trinkets. Madras is famous for jugglers, who are celebrated for superior dexterity; one of their most unpleasant feats is that of introducing a sword into the stomach, which they learn by early practice, introducing short pieces of bamboo in the first instance, which are gradually lengthened as the parts become habituated. To the north of the fort is the black town, which besides the Hindoos, contains Armenian and Portuguese merchants, Chinese, Moors, and black Jews. It is quite void of plan, splendid brick palaces being mixed with wretched bamboo cabins. In 1794 the population was estimated at 300,000 souls. The commerce of Madras is inferior to that of the other presidencies. The Company's staple article is piece goods. The markets are dearer than at Calcutta, but have been greatly benefited of late by the removal of some restrictions to which they had formerly been subjected. Domestic servants receive higher wages than at Calcutta, hence fewer are employed by any individual; yet the service is equally well performed.[a]

It was in 1639 that the English first had a fixed establishment on this coast, by virtue of a grant from the Hindoo sovereign reigning at Chandergherry, a descendant of the dynasty of Bejanagur, containing permission to build a fort. In 1653 the agent and council were raised to the rank of a presidency. In 1744 it was taken by the French, but was restored at the peace of Aix-la-Chapelle in 1749, in a greatly improved state. In 1756 the fort was greatly strengthened, and withstood in 1758, and 1759, a siege from the French, conducted with much skill and bravery. In 1767, and 1781, Hyder approached very near it with his armies.

The territory now forming the presidency of Madras is very extensive, comprehending the whole of Indostan south of the Krishna, the Northern Circars, and some tracts acquired since the degradation of Bajee Row, the last of the Peshwahs. This territory contains three princes, the Rajahs of Mysore, Travancore, and Cochin, who collect their own revenues, and exercise a degree of power in the internal management of their respective states; but, with reference to external politics, even these are wholly subservient to the British power, are protected by a subsidiary force, and furnish large annual contributions. The rest of the territory is under the immediate jurisdiction and control of the governor and council at Madras.

In 1811 the population of these provinces, not including the subjects of the three Rajahs, was computed to exceed 12,000,000. The number of civil servants on the establishment was 206; in 1818 it was 241. In 1811, the regular troops of all descriptions under this presidency amounted to 50,456, and the officers to 1347. In 1818, the military officers had increased to 1506, and the medical officers were 183. In 1813, the European inhabitants not in the service, residing within the limits of the presidency, were estimated only at 170, which was undoubtedly under the real number.[b]

The fortifications chiefly subservient to the defence of these territories in times of political disturbance, extend in a line crossing the continent from Fort George by Vellore, Bangalore, Seringapatam, and descending the western Ghauts, to Tellicherry. There is another line farther north, comprehending Chitteldroog, Bellary, and Gooty; and a third, extending from Masulipatam, by Ellora and Hyderabad, to Julna, where it is taken up by the Bombay army, and extends by Serroor, and Poonah, to Bombay.

The most northern district of the Carnatic is that of Nellore, and Ongole. It contains several copper mines remarkably fusible, and free from iron. But the attempts made to work them seem not to have answered the expectations entertained. The general rocks are primitive, consisting of mica slate of various colours. The manufacture and sale of salt are carried to a great extent in this district. Nellore, the capital, is situated on the south side of the Pennar river. It has a fort, the walls of which are of mud, with many port holes for small arms, made of tubes of baked clay laid in the wet mud in the building of the wall, and afterwards consolidated in the drying. In 1787, a peasant having struck on some brick work in his field, dug, and found it to be the remains of a Hindoo temple; he found also a pot which contained Roman coins and medals of the second century, mostly Trajans, Adrians, and Faustinas, all of gold, many of them fresh and beautiful, others defaced and perforated as if they had been worn as ornaments.

To the south of this district lies the northern district of Arcot; containing Arcot, the Mussulman capital of the Carnatic, sixty-eight miles S.S.W. from Madras. It is chiefly inhabited by Mahometans who speak the Hindostanee or Deccany language.[c] It is thought to be the capital of the *Sorœ* of Ptolemy; but the existing town is quite modern. It is extensive, and contains excellent houses. In this district is the Hindoo temple

[a] Lord Valentia's Travels. [b] Fifth Report on Indian Affairs.
[c] Qu. The Moorish Hindostanee or Moors language, spoken generally at the Mahometan courts in Indostan. The Mahometans, in general, are called Moors in Indostan.—P.

of Tripetty, the most celebrated in southern India, situated in a hollow inclosed by mountains, and not permitted to be visited or seen by any Christian or Mahometan. For this privilege a large sum is annually paid to government, which, in 1758, amounted to 30,000*l.*[a] Here also is Vellore, a military post of great importance previously to the conquest of Mysore, built in a valley on the river Palaur. It is defended by a number of forts situated on the surrounding heights. The mountains here contain old pagodas ornamented with inscriptions in the Tamul character.[b] Vellore commands the main road leading from the valley of Veniambady to Mysore. Its ditch contains large alligators. To this place the family of Tippoo was removed, after the taking of Seringapatam. Here also, in 1806, a serious revolt of the native troops, and a massacre of their officers, and other Europeans, took place, which was subdued, and the insurgents mostly put to the sword, by Colonel Gillespie and a party of dragoons.—Vellore is the present place of exile of the ex-king of Kandy.

The next district is Southern Arcot, extending as far south as Tanjore and Trichinopoly. In 1806 this district was in a wretched condition; many parts of it, naturally fertile, lay waste, and the revenue was collected with difficulty. In 1809 the leading inhabitants of the villages mostly combined to farm their own lands, in consequence of which the country and revenue have been greatly improved.

Gingee is reckoned one of the principal forts of the Carnatic. It stands on a stupendous rock, and, when well defended, is impregnable by the ordinary modes of attack. By the Indians it is esteemed, on account of its situation, the strongest town in the Carnatic. It is very unhealthy, and proved the grave of a large proportion of the French garrison kept in it while in the possession of that government. It contains the ruins of the palace of the old Chola kings of the Carnatic.

In this district Pondicherry is situated, though not comprehended in its jurisdiction, being in the possession of the French nation. It was once the most splendid European settlement in India. It stands on a sandy plain near the sea, producing only palm trees, millet, and a few herbs; but the surrounding district produces cotton and rice. Though a better natural station than Madras, it has no commanding advantages for commerce, and during the war with France, the inhabitants were reduced to great distress and poverty. It derives all its importance from being the capital of the French possessions in India. The French power in India began in 1749 under M. Dupleix, and ended with the surrender of Pondicherry in 1761; but during that interval it was remarkably brilliant; since that time it has always belonged to the British during war with France, and has been restored to the latter power on the conclusion of peace. At the peace of Amiens its inhabitants were estimated at 25,000, the revenue 40,000 pagodas, and the extent of coast five miles. Bonaparte took this opportunity to send out a large equipment, including a staff of seven generals, and carrying with them 100,000*l.* in specie. On the recommencement of hostilities the ambitious views thus manifested were disappointed, but M. Lenois, the admiral, had the good fortune to escape with his fleet. The French system of policy in this part of India was harsh and intolerant towards the natives. They destroyed the temples, forced the people to do work repugnant to their castes, and prohibited the residence of any family which was not Christian within their boundaries. Their revenue, in 1817, amounted to 12,988 star pagodas. Trivicary, a village sixteen miles N. W. from Pondicherry, seems to have been at one time a place of great extent and importance, as the pagoda is one of the largest size, having a stone tower over the gateway eight stories high, and the tank belonging to it occupied several acres of ground. It is remarkable for the petrifactions found in its neighbourhood. One of the petrified trees is 60 feet long, from two to eight in diameter, and in most places as hard as flint.

Sixteen miles south from Pondicherry is Fort St. David, once the head of the English settlements on this coast, but when taken by the French under M. Lally, the fortifications were demolished and never rebuilt. Close adjoining is the town of Cudalore, in a situation naturally strong. It is thought a better natural station than either Madras or Pondicherry. It was the seat of a British factory at an early period, and has been the scene of some sanguinary conflicts. Between the years 1780 and 1784, the country became desolate, the villages being laid in ruins, but since that period a happy and rapid improvement has taken place.[c]

The pagodas of Sidamburam or Chillambaram are situated on the sea coast, in lat. 11° 28′ N. thirty-six miles south from Pondicherry, and form a favourite place of pilgrimage. They are encircled with a high wall of blue stone. The chief of the four pagodas is on the same plan with that of Juggernaut, though on a smaller scale, and is esteemed a master-piece of architecture. Each of the three gates is surmounted with a pyramid 120 feet[d] high, built with large stones above forty feet long and more than five square, all covered with plates of copper, adorned with a variety of figures neatly executed. The whole structure extends 1332 feet in one direction, and 936 in another. In the year 1785 the main gateway was repaired by a devout widow, at an expense of 50,000 pagodas. The circuit forms a vast gallery, divided into apartments, in which the Brahmins live. In the area of the temple there is a large tank, skirted on three of its sides with a beautiful gallery supported by columns. A broad stair of fine red granite leads down from each of these galleries to the pool. On the side opposite to the water there is a magnificent hall, ornamented with 999 columns of blue granite, covered with sculptures, representing all the Brahminical deities. One of the greatest curiosities of this pagoda is an immense granite chain of exquisite workmanship, extending from four points of the circumference of the cupola of the nave,[e] and forming four festoons 137 feet long, with the ends held by four enormous wedge-shaped stones[f] belonging to the arch.

[a] Fr. Buchanan. Rennel's Memoir.

[b] On these mountains there are old pagodas, with vaults, ornamented with inscriptions, &c.—M. B.

[c] Orme's Indostan.

[d] 112 Fr. feet.

[e] "Quatre points de la voûte dans la nef."

[f] "Pierres en voussoir."

Each link is somewhat more than three feet in length, and the whole of a beautiful resplendent polish.[a]

The territory in which Madras is situated is called the Jaghire or Chingleput, now forming a collectorship. This territory was dreadfully ravaged with fire and sword by Hyder Ali, in 1780, and at the conclusion of the war in 1784 it contained no vestige of man excepting the bones of persons who had been massacred, and the walls of houses and temples which had been burned. After this it was doomed to suffer by a dreadful famine. Chingleput, its capital, is respectably fortified. Conjeveram, or the golden city, in the Chingleput, is an extensive place, containing a vast number of weavers. It has a magnificent pagoda adorned with beautiful sculptures. St. Thomé, three miles south from Madras, called by the natives Maliapuram, or "the city of peacocks," contained some Nestorian Christians when taken by Gama, who gave it its present name. It was taken in 1672 by the French, and in 1749 by the English, and is now subject to the presidency. Mahabalipuram, thirty-five miles south from Madras, is a collection of ruins on the sea side, containing many sculptures, also a temple cut out of the solid rock, with well finished figures of idols in *alto relievo* on the walls. At another part of the hill, there is a figure of Vishnu reposing on a pillow consisting of a numerously coiled snake. There are at the distance of a mile and a half from the hill, two pagodas cut out of the solid rock; a colossal lion, and an elephant as large as life. The town of Sadras, forty-two miles south from Madras, is in possession of the Dutch. It used formerly to be a populous place, and famous for the manufacture of ginghams.

To the south of the preceding,[b] is the district and principality of Tanjore, which, in point of fertility, is the second territory in Indostan; the first place being due to Burdwan, in Bengal. Prodigious mounds have been created to prevent the waters of the Cavery from rejoining those of the Coleroon, after their separation at Trichinopoly. The waters, thus preserved at a desirable height, are distributed by canals in all directions. The inhabitants are uncommonly industrious, and expert in husbandry. In 1807, their number was as follows:—

Brahmins,	17,149
Sudras, including native Christians,	42,442
Mahometans,	1,457
	61,048

The Mahometans of this quarter are all descendants of Arabian refugees who left Arabia in the eighth century, and are called Lubbies. The territory was never occupied by any Mahometan power; and the Hindoo religion has been preserved in considerable splendour. The people seem strongly attached to the British government, which indulges and protects their worship, and makes a liberal allowance from the revenue for the maintenance of the temples. In 1799, the territory was transferred to the British jurisdiction. The Rajah reserved several palaces, two forts, which are kept in excellent repair, and an ample revenue for the maintenance of his dignity. The present Rajah was educated under M. Schwartz, a respectable Danish missionary, and among Christians, yet he adheres steadily to the Brahminical faith and observances, but he is particularly kind to the Danish missionaries, and in other respects liberal in his sentiments. The Brahmins here are peculiar in having a printing press, which they employ in honouring their gods. The present Rajah has been all along sensible of his dependence on the good will of the British, and sets a high value on any attention which he receives from them. He understands the English language, has an English library, and reads the English newspapers. He made an earnest representation of the claim which he had to a higher title than that of Excellency first given to him, as he was not inferior to those Indian princes who were entitled Highness; and was greatly delighted when this claim was acquiesced in. The voluntary immolation of widows is still retained here, though discouraged by the Rajah, and not countenanced by natives of rank or education; the Brahmins, however, derive a profit from the cruel rite. The capital city, Tanjore, contains the finest specimen of the pagoda in Indostan; and within it a bull, carved from a block of black granite, which is an excellent example of Hindoo sculpture. In remote ages this was the great seat of learning, and here the almanacks were framed.[c]

Combooconam, 23 miles N. E. from the city of Tanjore, was the ancient capital of the Chola race, and still exhibits remains which indicate its former splendour; such as tanks and pagodas, which are very fine. Its houses are neat, and chiefly inhabited by Brahmins. The country around it is rich and highly cultivated. At this place there is a consecrated pond, which every twelve years has the quality of purifying those who bathe in it from all their sins, and forms a powerful attraction for countless multitudes of pilgrims.

On the east side of Tanjore is the Danish settlement of Tranquebar, the territory attached to which is of very small extent. The fort is large, and filled with population both European and native. The fortifications were a sufficient protection against the attacks of predatory cavalry, formerly not uncommon, but are not fitted to sustain a defence against a regular force. In 1812 the population of Tranquebar and its sixteen villages was,

Europeans,	487
Mixed breed, born in India,	370
Hindoos,	16,775
Christian natives,	601
Mahometan natives,	1,446
	19,679

Since 1814, when it was restored to the Danes, it has greatly improved in commerce and population. Negapatam, a maritime place, twenty miles south from Tranquebar, is the *Nigama* of the ancients. It has a good anchorage, and at the close of the last century exported annually four or five thousand bales of stuffs of various kinds. When in the hands of the Dutch it was the capital of their settlements on this coast, and had a very extensive gold coinage. On the south of Tanjore is

[a] Legoux de Flaix, I. p. 118.

[b] Properly to the south of Southern Arcot, in which Pondicherry is situated, and which intervenes between the Jaghire and Tanjore.—P.

[c] Lord Valentia's Travels. Fr. Buchanan. Rennel's Memoir.

the zemindary of the Tondiman family, which has been always friendly to the English, and has been much befriended in its turn; their finances being arranged and recovered at times of embarrassment by the management of agents appointed by that nation.

Trichinopoly, to the west of Tanjore, higher up the river Cavery, was a favourite residence of the Mahometans of the southern Carnatic. The district is fertile, though inferior in this respect to Tanjore. The climate is rendered milder than it would otherwise be by the moisture with which the air is impregnated. On the adjacent island of Seringham are two magnificent pagodas, which the Hindoos have long venerated. The island is formed by the separating of the Cavery into two branches, the northern being called the Coleroon. The chief pagoda is a mile from the western extremity of the island. It is composed of seven square inclosures, the walls of which are twenty-five feet high, and four thick. These are 350 feet distant from each other, the outward wall being nearly four miles in circumference, and some of the stones forming the columns of its gateways are thirty-three feet long, and five in diameter; those which form the roof are still larger. The other pagoda is a mile to the east, and has only one inclosure.

The district of Dindigul and Madura is situated chiefly about the tenth degree of north latitude, to the south of the preceding. At this part the low land of the Carnatic becomes broader. The central table land having terminated farther north, this lies on the south of it as well as on the east. Dindigul is a fine valley, through which the river Vyar flows with an easterly course, and, through the greater part of the year, is expended entirely on irrigation, so as never to reach the sea. The climate of Dindigul is usually the finest in India. May is the hottest month. In December and January, the thermometer seldom falls below 64°. It is in January, July, and August, that the superiority of its climate is most conspicuous. The numerous hills with which the province is interspersed occasion frequent cooling showers; yet this district was in 1809, 1810, and 1811, desolated by a destructive epidemic fever, which greatly thinned the population, and destroyed the cattle. From April 1st, 1810, to the corresponding term in the following year, 21,510 persons died. The deaths in ordinary years do not exceed 3438. The town of Dindigul contained 7000 inhabitants before the epidemic: in 1812 their number was reduced to 3195. Part of this district goes under the name of the "territory of the Poligars," but is not peculiarly entitled to that distinction from any singularity in the mode in which the land is held. The heads of villages always have possession of the lands; and, sometimes, when favoured by the strength of the country, these have assumed the name and character of poligars; but the true poligars were originally banditti, who afterwards obtained a regular jurisdiction within their boundaries.

The Madura subdivision of this district, lying farther south, and at less elevation, is warmer than Dindigul; the heat in December and January being seldom below 66°. In May it ranges from 79° to 98°. Some marshy tracts adjoining the hills render the climate unhealthy; and near Tondiman's country, there is a quantity of jungle which has a similar effect. The ancient sovereigns of this country were named the Pandian race, and it is supposed to have been the *Modura Regia Pandionis* of Ptolemy.[a] In conjunction with Trichinopoly it forms a Hindoo division named Madree. It was formerly one of the holy countries, the capital being styled the southern Mathura, and it still contains some remains of ancient grandeur. Christianity has gained considerable ground in this quarter. In 1785 there were 18,000 Roman catholics, and many protestants. In 1809, 1810, and 1811, it was depopulated by the epidemic already mentioned. Madura, the capital, is an ancient city, and formerly well defended by a strong fort, three miles and three quarters in circumference. It sustained many sieges in the wars from 1740 to 1760, being often in the hands of refractory poligars, who then abounded in the country; but the cessation of warlike operations has now superseded the utility of such forts. The population has decreased of late years, and the people are poor and very ill lodged. The streets are narrow, and rendered particularly dirty by the stagnant water of the old drains, and by a multitude of cattle kept within the city. It contains a famous temple consecrated to the god Vellayadah, to whom the devotees bring whimsical offerings of shoes of colossal magnitude, highly ornamented. A maritime part of this district, called Marawah, contains a race of professed robbers, called Coilleries, who frankly avow their profession, consider it as their legitimate hereditary right, and merely observe that matters are now so changed as greatly to curtail the exercise of it. This territory contains a caste called Totiyars, among whom a plurality of male kindred have their wives in common. There is a zemindary in it called Shevagunga, where the dogs are held in high estimation among the Hindoo princes, while these animals in every other part of India are regarded with unreasonable contempt. At the town of Ramnad, near the coast, there is a protestant church of very neat architecture. In all this country the females have a leading influence in fixing hereditary successions.[b]

The island of Ramisseram, lying between this coast and the island of Ceylon, is greatly celebrated in the Brahminical mythology. It contains a pagoda much frequented by pilgrims. Rama, an incarnation of Vishnu, is believed to have erected this building on his return from vanquishing Ravan, the king of the giants, and conquering the island of Ceylon. Rama is believed, on this occasion, to have restored for a short time by miracle the isthmus which, at a more remote period, had connected Ceylon with the continent, and of which the chain of islands, rocks, and shallows, now extending across, forms the remnant. This line of rocks is called "the bridge of Rama," an appellation for which the Arabians have substituted "the bridge of Adam." The pagoda is extremely massy, resembling the Egyptian architecture. Water is brought hither from the Ganges by the pilgrims, poured over the god, and then sold to the devout at a price which brings a considerable revenue to the temple. The guardianship

[a] Pandi-Mandalam, or the Kingdom of the Pandis.—P.

[b] Fifth Report.

of this sacred isle is vested in a family of devotees, the chief of which is Pandaram, who is bound down to perpetual celibacy, and the family succession is kept up by the sisters; a mode of establishing legitimate descent which prevails over the southern extremity of India.[a]

The district of Tinnevelly occupies the extremities of the Carnatic and of the whole peninsula, being separated from the province of Travancore on the west coast by the Travancore ridge of mountains, a continuation of the western Ghauts. It contains some rivers and salt marshes, separated from the sea by high sand hills. This district has one peculiarity of climate, that a fall of rain is always expected late in January, which raises the rivers, and replenishes the tanks. For this reason the latter are of smaller size than in the preceding districts.

Two places in this district are remarkable as cool retreats for persons injured by the climate, viz. Trichendore, and the valley of Courtallum; the latter, in particular, is highly grateful to the feelings of a European, early in June, after the commencement of the heavy rains of Malabar, and it contains a waterfall, under which invalids take a shower-bath, which greatly contributes to their recovery. But from February to May this place is close and sultry, being deprived of the influence of the southerly winds. Trichendore is on the sea side, thirty miles east from Palamcotta. Rice and cotton are the chief produce of this district. The cotton is of a remarkably fine quality. The English, before they obtained possession of Ceylon, made attempts to introduce the cultivation of cinnamon and other spiceries in this district, which might have succeeded to a certain extent, had not subsequent political changes rendered such plantations unnecessary. The nutmegs and cloves entirely failed; these articles are not even produced in Ceylon, and cinnamon itself thrives only in a limited portion of it.[b] The cotton of this district is exported to Madras, and there consigned for sale to China. In this district the peculiar Hindoo manners are supposed to be more pure than any where else. The principal towns for size and population are Tinnevelly, Alvartinnevelly, Spermadevy, and Culdacoorchy, but none of much consequence. At Tuticorin, ninety miles north-east from Cape Comorin, there is a pearl fishery, but the pearls are not equal in quality to those found on the coast of Ceylon. A superintendant deputed by the British government attends constantly during six weeks. The net revenue derived from it in 1807 was 81,917 star pagodas.

In this district Cape Comorin is situated, called in the Malabaric language Komari and Kanyamuri, forming a majestic termination of the mountain chain of the Ghauts, and of this triangular portion of the Asiatic continent. Its summit is 1294 English yards in height, covered with a bright verdure, overlooking a fine cascade, and a plain filled with forests. Parvati, who in the Hindoo mythology is goddess of the mountains, seems to be the divinity who, according to Arrian, has sanctified this promontory and the adjoining ocean, and for this she is surnamed Komari. Francis Xavier had the address to turn these traditions to good account for promoting the objects of his mission, by making one of the most conspicuous of these rocks the site of a church dedicated to the Virgin Mary.

Turning now to the Central Plateau, we find, in the most northern part of it, bounded by the line of the Tomboodra and Krishna, a province usually called "the Ceded Districts of Balaghaut." This term is restricted to the territories acquired by the British government in 1800, and now divided into the collectorships of Bellary and Cuddapah. The ceded districts contain more ground than Scotland. The waters of the Tomboodra and Krishna form a strong barrier to this province for the greater part of the year, and also contribute to its fertility. The soil is in general more fertile than either that of Malabar or Canara. Drill husbandry is universal. The period of the rains is uncertain, but one night's rain enables a farmer to sow his seed, and three nights secure a good crop. Where the land is overrun with shrubs, the expense of clearing is great. The good trees are for the most part entirely destroyed by the wars with which the country was long devastated. The British found the whole social arrangements of this territory in the most horrible confusion. The rebellions of the poligars, struggling with the more organized rapacity of the Mahratta and Mahometan governments, the extortions of the revenue officers, and the plunderings carried on by persons who purchased the privilege of freebooting, had made every man a ferocious enemy to his neighbour. Few families escaped assassination, or were free from the imputation of murder. When the British power had begun to establish a system of order and tranquillity, and the country was beginning to recover, it was visited by a severe scarcity in 1803 and 1804, from the failure of the necessary rains, which required all the exertions of government to prevent the horrors of absolute famine. But since the year 1805, in which the season was favourable, these districts have greatly improved. In 1806 the population amounted to 1,907,376, and had increased by one fourth in five years, partly from the return of inhabitants who had emigrated during the Nizam's domination. In remote times, this province formed part of the last Hindoo empire of Bijenagur. It was in the possession of different Mahometan powers in succession till 1800. It is of great value as a source of supplies for the armies in the Deccan.

The district of Bellary is in the west part of the province. The zemindary of Harponelly in this quarter, was restored to the family after the fall of Tippoo's power; at least an heir was brought forward, though it was suspected that he was not legally entitled to the succession, but set up by the Brahmins with the view of perpetuating the management in their own hands, and preventing the power from being absorbed by government. This is a frequent practice when a line becomes extinct. Some public treasure was carried off from this place by the Mahrattas and Pindarees in 1817. Soondoor, twenty-five miles from Bellary, was a favourite place of pilgrimage with the Peshwah, who in 1807 and 1815, made a visit to the temple of Cartic Swamy, (the god of war of the Hindoos,) but a crowd of other pilgrims took the opportunity of accompanying him, and committed dreadful irregularities. On

[a] Cordiner's Account of Ceylon, vol. II. p. 1—31.

[b] See the subsequent book, *passim*.

the last of these occasions it turned out to have been a premeditated plan on the part of the Peshwah to take forcible possession of the district, though it was preceded by the most formal engagement that all his followers should be left on the north side of the Tomboodra. In the territory of Cornoul, in the north-east of the province, called in our maps Ghazypoor, there are diamond mines at a place called Banaganpilly.

The collectorship of Cuddapah is in the east and south part. Here abundance of soda is found in a black soil, among the Pennaconda hills. The spots producing it are known by their barren aspect, and the black colour which the mould exhibits in the morning. It is mixed with kitchen salt. Nitre also is abundant, and easily extracted by a simple process. About seven miles from the town of Cuddapah, there are diamond mines on the banks of the Pennar river. This river intersects the district of Gandicotta, and finds its way through a deep and perpendicular gap in the Gandicotta hills, into the plain of Cuddapah. The fort of Gandicotta was formerly noted for its strength, but is now a place of no importance. The valley is fertile and populous, and celebrated for its diamond mines.

On the south and west of the preceding province is that of Mysore, the theatre of the celebrated military events in which first Hyder Ali, and afterwards his successor Tippoo, were the most conspicuous actors. It is situated chiefly between the eleventh and fifteenth degrees of north latitude; but, consisting of a table land, nearly 3000 feet above the level of the sea, it enjoys a much more temperate and salubrious climate than any other country of equal extent within the tropics. From the remains of hedges, and other signs, this province appears to have been, at some remote period, in a much higher state of cultivation than at present; but it is now rapidly recovering. It produces, besides rice, the chicada, the dodada, the *Phaseolus mungo*, the *Dolichos catjang*, and the sugar cane. The crop of *Cynosurus coracanus*, or raggy, is by far the most important of those raised on the dry field, and forms the support of all the lower ranks of society. Abundance of castor oil is produced, which is burned in lamps, and given to milch buffaloes. As to sugar plantations, it is only the prodigious difference in the cheapness of labour that enables those of Indostan to approach, in point of economy, to those of the West Indies, which have so decided an advantage in point of soil, climate, carriage, and agricultural and mechanical skill.[a] Poppies are cultivated both for the sake of the opium and the seed, which is used in the sweet cakes eaten among the most luxurious of the natives. The cocoa tree is very productive in this territory, notwithstanding its distance from the sea. It seems to flourish in any situation which conjoins the requisite temperature with an impregnation of sea salt in the soil. From this and other species of the palm tribe, the juice is obtained which ferments into the liquor called toddy, a term which seems to be a corruption of *tari*, the Mahometan term for the juice of the palmyra, or *Borassus flabelliformis*. The great defect in agriculture here consists in the imperfect cleaning of the fields from the grass roots, which vegetate with great vigour, and are difficult to subdue. In 1804 the number of families in Mysore was 482,612, of which only 17,000 were of the Mahometan religion, though the province had been thirty-eight years under zealous sovereigns of that faith. The Brahmin families were 25,370, the Lingait 72,627, and the Jain 2063. The Hindoos of this province are immersed in the most deplorable superstition. When two parties in a village have a dispute, it is not uncommon for one of them to have recourse to an expedient by which both suffer: this is, to kill a jack-ass in the street. After such an act the place is deserted; no Hindoo will live in it unless by compulsion. Another expedient of revenge is, for the proprietor of a garden to catch a number of monkeys and squirrels in a net, and convey them by stealth into the garden of another, where they destroy the produce, and are protected from being killed by the superstitious veneration in which they are universally held. These acts of reciprocal injury have of late become more rare from being found ultimately so unprofitable. The men of this province are stout and healthy, and their complexions a tinge fairer than those of the natives of Coromandel. The women in general possess graceful forms, and dress in a becoming style. The division of time here is singular. Instead of dividing the diurnal period into twenty-four hours, and each hour into sixty minutes, they divide it into sixty hours, consequently twenty-four minutes form an hour. In the country round Seringapatam, the people are divided into what are called right hand and left hand sides:[b]—the first comprehends nine castes, and the second eighteen. The circumstances which add dignity to the members of any caste are, its following no useful employment; being restricted from the pleasures of the table; and being devoted to piety and learning. Hence a disgusting hypocritical cant is the prevailing fashion. The arrangements which take place in the family of the Rajah of Mysore are whimsical in the extreme. The males are divided into two great branches, the Raja Bundas, and the Collalays, who intermarry. The head of the first is the Curtur or sovereign, and of the other the Dalawai. Some of each family are of Vishnu's side, others of Siva's; none wear the lingam,[c] and all acknowledge the Brahmins as their spiritual guides. The Curtur, on ascending the throne, whatever religion he has been educated in, always adopts the ceremonies of the Sri Vaishnavam. On the contrary, the females of both families wear the lingam, reject the authority of the Brahmins, and are under the spiritual guidance of the Jangamas. Such inconsistent arrangements are not uncommon among the Hindoos.

This province is less subject to the English than most of the others, the Rajah of Mysore enjoying great influence under the patronage of the supreme government. In 1812 the Rajah having attained the age of nineteen, and shown talents adequate to the active charge of his dominions, together with a desire to enter on the exercise of his prerogative, the Dewan Purneah, his minister, who had previously the sole management, was at

[a] For a full account of the cultivation and manufacture of sugar in this province, see Dr. F. Buchanan's Journey through the Mysore, &c. *passim*.

[b] Dr. Fr. Buchanan's Journey, vol. I. p. 77. 250. II. p. 268. 294.

[c] An indecent emblem of fertility.

first actuated with the most indignant resentment, and used insulting conduct to the Rajah; and, when the change of administration was carried into effect, conceiving himself degraded, was so deeply affected that he lost his understanding from a paralytic attack, and soon died.

The leading city in this province is Seringapatam, the capital of Tippoo, in lat. 12° 25′ north, and long. 76° 45′ east. It is situated at the upper end of a large island formed by the Cavery, which is here a large and rapid river, and has an extensive channel interrupted with granite rocks. The island is about four miles long, and a mile and a half broad. The neighbouring country rises gradually from both sides of the river, the ground being finely watered, partly by native streams and partly by canals conveying the water from places where the river has been dammed across. The fort is an injudiciously contrived building, in an unfinished state, and occupies about a mile at the west end of the island. Tippoo retained the long straight lines of wall, and the square bastions of the Hindoos; and his glacis was in many places so high and steep as to afford shelter to the assailants. Hyder's palace at the east end of the island is built of mud, but is an elegant and handsome native structure. Near this is the magnificent mausoleum of Hyder, where himself, his wife, and Tippoo, lie buried under tombs of black marble. The British government is at the expense of covering these with rich cloth, and maintaining the former establishment of priests to offer up prayers, and of musicians to perform the Nobut. The palace in the city, though large and massy, has, like all the public edifices, a mean appearance. Hyder's palace is now the residence of a surgeon; his seraglio is converted into a European hospital; his private apartments are occupied by the resident, and his public rooms by European soldiers.[a] Tippoo's seraglio is an artillery barrack. All these buildings look heavy for want of windows, and are too closely shut up to suit the taste and convenience of their present possessors. This island in Tippoo's time probably contained 150,000 inhabitants; at present they may be estimated at 32,000, besides the garrison. Many have gone to Mysore, the residence of the Rajah; and some Mahometans who originally belonged to the Carnatic have returned to their native country. Timber is dear here, being brought from the western Ghauts. Bread also is dear; and the European soldiers are obliged to eat rice; but meat and vegetables are both abundant and of excellent quality.—Seringapatam was the scene of two memorable warlike events; each decisive of the war in which it occurred. One was the successful attack by Lord Cornwallis on Tippoo's fortified camp, under its walls, on the 6th of February, 1792. Tippoo's army consisted of 40,000 infantry, besides a large body of cavalry. For the attack 2800 Europeans and 5900 native infantry were selected. The attacking army lost 535 men in killed and wounded. Eighty guns were taken; the Sultan lost 4000 men, and his army was, by subsequent desertion, reduced to 20,000. Tippoo relinquished one half of his dominions, and paid three crores and thirty lacks of rupees (about L.3,500,000) in bullion. The force brought against him on that occasion was one of the most formidable ever collected in India; consisting of 11,000 Europeans, 31,600 natives in the British service; and, belonging to the Mahrattas, the Nizam, the Rajah of Travancore, and the Coorg Rajah, 40,000; the persons attached to the camps of the confederates exceeded 400,000; the bullocks employed in bringing supplies amounted to half a million; there were several hundred elephants, and many thousand camels.—The other warlike event was the storming of the city on the 4th of May, 1799, by General Harris. The garrison amounted to about 5000 men, of whom a great proportion was slain, and the dead body of the brave Tippoo was found under a gateway. The particulars of his death remain otherwise unknown; and it was never discovered who had obtained possession of his valuable necklace of pearls. The British took possession of the island, and it has ever since been kept strongly garrisoned. As a fortress, it controls the west coast of Malabar, and the adjoining low and open districts of the Carnatic on the east and south. The spot, however, is unhealthy, and liable to epidemics. Intermittent fevers prevail over the whole of Mysore.

The city of Mysore, the ancient capital of the province, and the present residence of the Rajah, is in lat. 12° 19′ north, and long. 76° 42′ east; about nine miles north-east from Seringapatam, and in the same valley. Tippoo had attempted to remove it from its former site to an eminence about a mile distant; but it is now in its old station. The Rajah's fort is well built, and kept in very good order. The ancient name of the place was Purragurry; but in 1524 the fort was built or repaired, and received the name of Mahesh-asoor from a buffalo-headed monster who was overthrown by the prowess of the goddess Cali. This name has since been contracted to Mysore. We have already, in the general account of the physical aspect of India, taken notice of the river Cavery, which, from its great subserviency to agriculture, is the most useful river in the south of India. Chitteldroog, the chief town of a district, has a remarkably strong fort, belonging to the Rajah, on a rock with five peaks, 2640 ells in height. The surrounding country is dry and clear, but it is reckoned unhealthy. Bangalore is a large fortified town, seventy miles north-east from Seringapatam. Here Hyder had constructed a fort according to the best fashion then followed among the Mahometan states; but Tippoo finding it quite insufficient to sustain an attack from the British troops, destroyed it. Dewan Purneah, however, the late minister of the Rajah, rebuilt it in 1802. It used to be a place of great trade, but its prosperity was ruined by the domineering interference of Tippoo in the concerns of trade. The Mahometans of this place now suffer great distress from the change of the government. In this part of the country a peculiar affection of the skin is very common, in which it becomes entirely white. It does not in any way affect the health of the individuals in whom it occurs; and their children are like those of other people. The town of Maggri, twenty-two miles west from Bangalore, is filled with pagodas, public choultries, and monuments of Indian architecture and sculpture. In the neighbourhood are many iron forges, and a manufacture of steel. A great quantity of sandal-

[a] Dr. Fr. Buchanan, vol. I. p. 69.

wood is found in the adjacent forests; the best of it grows on a rocky soil.

On the south of Mysore is the province of Coimbatoor, between Malabar on the west and Salem on the east; the Ghauts are in its western part, and from thence some tributaries of the Cavery flow eastward through the province. It is on the whole fertile. The ox is considered by the people here as a living god, who gives them their bread. In every village one or two bulls are kept, to which monthly or weekly worship is paid; yet much of the country which has been formerly cultivated now lies waste. In the useful arts the people are much inferior to the inhabitants of Mysore, and the latter are inferior to the natives of Madras and Calcutta. The capital, Coimbatoor, is 112 miles south by east from Seringapatam. It contained only 2000 houses in 1801, but in Hyder's time it had double the number. Tippoo sometimes resided at Coimbatoor, and built a mosque in the place. At Perura, two miles from this city, there is a celebrated temple, dedicated to Siva. The idol is said to have placed itself here; and afterwards, about 3000 years ago, a Rajah of Madura erected the temple over it. This, and the temples of Mailcotta and Seringapatam, were spared by Tippoo when he issued a general order for the destruction of all idolatrous temples. The building is highly ornamented, but the figures are rude, and some of them indecent. The height of the mountainous part of Coimbatoor is not exactly ascertained. In January, 1809, it was visited by a party of Europeans, who found the cold severe enough to freeze water to the thickness of half an inch, while the thermometer in the adjacent country stood at 84°. This hilly tract is divided into three countries, called the three Naads, which are inhabited by three distinct classes of persons: the first are, the Todevies, who are exclusively herdsmen, and go bare-headed and bare-footed. The Koties are more diminutive, and their features are less expressive; they consist of cultivators, artisans, musicians, and dancers; like the former, they wear no covering on the head or feet. The third class, called the Bergies, are the principal cultivators and land holders; and are supposed to have emigrated from Mysore 300 years ago. These three classes of persons speak distinct languages, wholly unintelligible to one another.

To the east of the preceding province, and separated from it by the river Cavery, is the province comprehending Salem and Barramahal. It is, on the whole, an elevated region, declining to the south-east from the central table land, the eastern Ghauts forming its north-west frontier. The principal grains cultivated in it are maize and rice. Two crops of the former are obtained in the year, one of which is reaped in April, the other in September. It also produces a quantity of cotton. A great part of the land lies waste. Barramahal is in its northern part. The most elevated country consists of cold hills, where the natives of the adjoining districts are unwilling to settle. The poligars of the high lands have been restored to their estates on condition of paying a fixed rent or tribute, but have no jurisdiction over the inhabitants. When a rich man constructs a reservoir at his own expense for irrigation, he is allowed to hold in free estate by hereditary tenure one fourth of the lands so watered; but is bound to keep the reservoir in repair. Tanks of this sort, where the holder of the free estate can be compelled by the inhabitants to do his duty, are well known to be much better kept than those supported by government. The fort of Kistnagherry is on a rock 700 feet in height. The British troops were repulsed from this place with considerable loss, in an attempt to storm it in 1791. This province, in general, is full of beautiful and picturesque situations.

The coast to the west of the central plateau, contains some provinces which remain to be described, viz. Canara, Malabar, Cochin, and Travancore.

The province of Canara begins at Cape Rama, at a short distance from Goa, in the Concan. It extends south till it comes in contact with the province of Malabar. The tillage lands of this province are well cultivated with rice, though the surface is so rugged (being traversed by rocky hills from the Ghauts to the sea) that the produce must be transported from one part to another on men's heads. Bullocks are seldom used. Manure is scarce. The cattle are not much larger than long legged goats, a circumstance ascribed to the constant humidity of the surface. Gardens of cocoa trees are not so numerous as in some neighbouring parts, as the rice cultivation is so much more profitable; but there are some sandy spots well adapted for these trees. Good trees yield from fifty to a hundred nuts annually, in four crops; weak ones less than fifty.

This province remained undisturbed in the hands of Hindoo princes till Hyder Ali subdued it in 1763. He found it in a state of high cultivation. It devolved to the British in 1799, and has ever since been singular for a state of perfect tranquillity, prosperity, and an easy realization of the revenue. The land in this province has always been more in the situation of private property than in the rest of India, and the revenue is comparatively moderate. The inhabitants have, under their present masters, become more comfortable in their situation, and make a better appearance in their dress, than formerly. Farms and possessions are usually very small, and cultivated by the resident proprietors with a minute attention, and an ardour, which are apparent in the neatness which prevails in the inclosures, and in every part of the culture.

In 1807 the population was estimated at 576,640 souls, of whom the Brahmins amounted to 98,610, an unusually large proportion, and thought by some to be a cause of the superior civilization of this province. The Jains are more numerous than in any of the adjacent countries. Tippoo destroyed many of the towns, and took 60,000 Christians captives to Mysore, from whence few ever returned.

This province is usually divided into North and South Canara. North Canara, which is the largest, lies between the thirteenth and fifteenth degrees of latitude. The sea coast here is chiefly occupied by villages of Brahmins; the interior parts belong to the Buntar caste. The Brahmins here are mostly descended from those of the north of India, and are held in great contempt by the Dravida Brahmins of the south, chiefly because they eat fish. There are said to be five different nations between Onore and Tellicherry, who, though mixed together, retain distinct languages and characters, and a

distinct national spirit; the Nairs, Coorgs, Tulavas, Concanies, and Canarese.[a] The Comarapeca, or true Sudras of this division, are both cultivators and soldiers, strongly inclined to robbery, and had acquired an uncommon degree of cruelty during times of anarchy. In a particular portion of this division there were, in 1800, 4834 houses occupied by Brahmins, 1500 by Mahometans, 385 by Christians, 147 by Siva Bhactars, and 87 by Jains.

Soonda is a small subdivision, situated above the Western Ghauts. The town of Soonda was at one time a very large city, three miles in diameter each way being occupied with houses; but the houses have been reduced to 100, chiefly by the ravages of the Mahrattas and Hyder. In the western part of this subdivision the garden cultivation is the chief object with the farmers, who raise betel nut, black pepper, betel leaf, cardamoms, and plantains. The town of Karwar has an English factory and fort, and was formerly a noted seat of European commerce; but went to ruin in the time of Tippoo. The town of Onore was formerly a place of great trade, especially in pepper. It also was totally demolished by Tippoo; but part of it has been lately rebuilt, and a custom-house has been established in it. The lake of Onore is of great extent, reaching nearly to the Ghauts, and contains many islands, some of which are cultivated. It abounds with fish, which are dried, and form a considerable article of inland commerce. During the dry season the water is very brackish, but by the great supply which it receives in the rainy season from numerous streams, it becomes quite fresh. The town of Barcelore, thought by some to be the *Barace* of the ancients,[b] was once a considerable place of Portuguese and Arabian trade. In 1557 it was governed by a Ranny or female sovereign. The town of Cundapoor is situated on a river, which forms the boundary line between north and south Canara. The mouth of the river forms a lake which receives five fresh streams, has only one opening into the sea, and contains a number of islands.

South Canara is called Tulava among the Hindoos. The soil here becomes worse in proportion to the distance from the sea. The interior is occupied by Hindoos, and the sea-coast by Mahometans, here called Moplays. In 1800 the population consisted of 206,633 males, and 190,039 females. The number of houses was 80,000, of which 7184 belonged to Brahmins, 5223 to Mahometans, 2700 to Jains, 2545 to Christians, and the remainder to low castes of Hindoos. The number of slaves, male and female, was 7924. During Tippoo's government the Hindoos were obliged to skulk in the woods, and all who could be caught were circumcised, by which rite they lost the Hindoo caste, and became good Mahometans, forming a caste by themselves. Many of the Christians also of this country were compelled to profess Islamism, but more than 15,000 have returned to the church. Before the time of Tippoo the Christians had twenty-seven churches in this neighbourhood. Jains greatly abound, and seem to have been at no remote period the prevailing sect in this province.

Mangalore, in this part of the province, is a flourishing sea-port town, in lat. 12° 53′, built in a beauiful situation round the shore of a small peninsula, which is elevated in the centre, and once contained a fort in that situation. In Hyder's time the principal merchants were Moplays and Concanies; but since the British acquired the government, many men of property have come to settle in it from Surat, Cutch, and Bombay. These are chiefly of the Vaisya caste, along with many Parsees. It was the scene of some violent conflicts during the Mahometan dynasty of Mysore.

At the river Chandraghiri, bounding Canara on the south, the Hindoo region of Malabar commences, and extends to Cape Comorin. The British province of Malabar forms only part of this region, the remainder consisting of Cochin and Travancore. The British province extends about 200 miles along the coast. This province contains few villages or towns, except on the sea-coast, each man living distinct on his estate or farm; the house being within the garden, which is surrounded by a high bank and deep valley, like a rampart and ditch. Black pepper is the chief article of export. Almost the whole land is private property. The approved history of this country is, that it was created, or raised from the bottom of the sea, for the use of the Brahmins! There are established rules of great antiquity, for the transfer, lease, and mortgage of estates. The Mahometans or Moplays, being persons of industry and business, acquire great advantages over the idle and dissolute Nairs, so that they often make purchases or obtain mortgages of the estates of the latter.

The principal division of the Hindoo castes here, is into I. Namburies or Brahmins; II. Nairs of various classes; III. Tiars, the free cultivators of the soil; IV. Malears, musicians and conjurers, also freemen; and V. The Poliars, or bondmen, attached to the soil. The distance of intercourse by which the different castes are separated, is laid down with great precision.

I. A Nair must not touch a Brahmin; a Tiar must keep at the distance of thirty-six yards; and a Poliar ninety-six steps. II. A Tiar must not come within twelve steps of a Nair; a Malear within three or four; or a Poliar within ninety-six. III. A Malear must not touch a Tiar. IV. A Poliar must not come near even to a Malear, or to any other caste. If he wishes to speak to any one of them, he must stand at the prescribed distance, and call aloud. When any unfortunate violation of these rules occurs, the person polluted by it purifies himself by bathing and reading the sacred books, according to rules which vary with the degree of contamination incurred. There is a still more loathed race of outcasts in Malabar, called Niadis, who wander in small companies, and when they see a passenger, set up a howl which warns him not to come too near, and proclaims the necessities of the wretched individual. The charitably disposed lay down what they mean to bestow, and go away; and then the Niadis approach and pick it up. They eat tortoises, and sometimes aligators.

The most remarkable of the castes in Malabar is that

[a] Abbé Dubois.

[b] D'Anville supposes Barace to be found in the islands now called Barseti or Balseti, in the gulph of Cambay —P.

of the Nairs, who are subdivided into eleven gradations. They are the Sudra, or mili ary caste,[a] and, though not all following the military profession, were formerly all liable to be called on for military duty by the Rajahs. At present they work at various handicraft occupations; they are under the direction of the Brahmins; they are fond of appearing in arms, and often practise assassination; their arrogance towards the inferior castes was formerly of the harshest kind. A Nair was expected to cut down any Tiar, or Mucua, (fisherman,) who presumed to touch his person, or any Poliar, or Pariar, who did not turn out of his road as he passed. The Nairs, in common with all the Malabar Hindoos, are as remarkable for thoughtless profusion as the people in other parts of India for extreme parsimony. But the most singular characteristic of this race is to be found in the terms of intercourse observed by the two sexes. They marry before the age of ten, but the husband never cohabits with his wife; she lives with her mother or her brother, and is at liberty to cohabit with any other man who is of equal or higher rank. Hence no man knows his own father; his brothers and sisters are only known by their common relationship to one mother; and when a man dies, his property descends, not to children supposed to be his own, but to those of his mother or his sister. The mother manages the house, and at her death the eldest sister assumes the direction.

Before the time of Hyder, this country was governed by numerous chiefs or landed proprietors, whose jurisdiction continually varied in extent, according to the circumstances of succession. The Moplays, along the sea-coast, are descendants of Arabians, and extremely fanatical in their religion. The mutual antipathy which subsists between them and the Hindoos is very great.

The Christian religion was early introduced into Malabar, and the professors of that religion seem to be entitled to be considered as a distinct primitive church. They reject the supremacy of the pope, the mystery of transubstantiation, and the adoration of relics and images. When Vasco de Gama arrived at Cochin in 1603, he found a political community professing the Christian faith, with a king at their head. But, finding that they differed from the church of Rome, the Portuguese exerted themselves to convert them, both by persuasion and force. Hence there are many Roman Catholics here who have their places of worship. The original church uses Syriac copies of the sacred books, and the same language is retained in those used by the proselyted churches. The members of the former are sometimes called Nestorians, sometimes the Christians of St. Thomas. They trace their origin to the apostle of this name, who, according to them, visited their country; but it is more probable that the founder of their church was another Thomas, who landed on this coast in the fifth century. They acknowledge the patriarch of Antioch as their superior or head. They are called sometimes the Syrian Christians.[b] They highly value the Syriac language as the sacred dialect in which Christ and his disciples spoke; that language is not understood by the people, and therefore extemporaneous explanations of the Scriptures are given by the clergy. The Syriac is, in fact, used among them as the Latin Vulgate is in the church of Rome. Among the mountainous parts of Travancore, Dr. Claudius Buchanan found many simple and amiable communities of these worshippers; and he put them on a plan of having the Scriptures translated into the Malabaric, the vernacular language of the country. Those who have been converted to the church of Rome are chiefly on the sea-coast. After yielding to the doctrines and practices of the subjects of the pope and the inquisition, they made a firm stand when required to give up the Syriac as the sacred language appropriated to divine service, and to adopt the Latin in its stead; and the missionaries were, by their obstinacy, necessitated so far to relax in this point as to allow them to retain the Syriac. They are distinguished by the appellation of the Syro-Romish Christians. The total number of Christians on the Malabar coast is estimated at 200,000, of whom about 90,000 are in the Travancore country. The villages of Malabar are the neatest in India; the houses are contiguous, in a straight line, built of mud of an excellent quality, well smoothed and painted; but being thatched with palm leaves, to prevent the mud from being washed away, they are extremely combustible. The higher ranks use little clothing, but are remarkably cleanly in their persons; so that cutaneous disorders are only known among slaves and the lowest castes. The beauty and elegant dress of the Brahmin women give some lustre to the general aspect of society. Common fowls were not known among the original natives, but since they have been introduced by Europeans, they are to be had in abundance.

Hyder, when he took this province in 1761, found in it large quantities of treasure, which had been accumulated by the inhabitants for ages. He drove out all the Rajahs except those who instantly submitted to him. He proceeded gradually to settle them after frequent outbreakings. Tippoo, however, in 1788, firmly established his sway, and enforced his religion by an overwhelming army, circumcising all those whom he could lay hold of. The British, on subduing Tippoo, restored the expelled Rajahs, and reinstated them in their possessions; but, in three successive settlements, these failed to fulfil their engagements; they maintained a rule over the people of the most oppressive description, and the country was distracted by insurrections. The Rajahs were, for these reasons, ultimately deprived of all authority, and allowed a fifth part of the revenue to support their rank. The refractory among them have been subdued by military force, and local arrangements have been made by which tranquillity is now restored. The population in 1800 was reckoned 600,000, but must be considerably greater. More than one third are Mahometans.

The sea-port town of Tellicherry, in lat. 11° 45′, was long the chief English settlement on this coast, but has declined since the Company's commerce was removed

[a] The Sudras are properly the servile caste, and the lowest of the four great castes of Hindoos; but the pure Sudras or Nairs form the military caste in Malabar, divided into two classes, the Kirit and the Proper Sudras, or militia of the country. The Tiars are an inferior class of cultivators —P.

[b] Their designation is properly "the Syrian Christians," or "the Syrian Church of Malayala."—P.

to Mahé. The richest natives still reside here, and the inhabitants are far more civilized than in the rest of the province. It contains an arsenal, and is a great mart for pepper and cardamom, sandal and teak wood, cotton stuffs, and other Malabaric goods. Mahé is the principal French settlement on this coast. It is finely situated on high ground, at the mouth of a river; the situation being much better than that of Tellicherry. The French have in general been guided by more enlarged and judicious views in the selection of their stations than the English, who seem to have been attracted solely by the temporary resort of commerce.

The city of Calicut, in lat. 11° 15′, is a place of great trade. It has been the scene of some sanguinary contests, in which the Portuguese in the first instance, and afterwards Tippoo and the English, were concerned. It contains 5000 houses.[a] The Rajah of the Calicut district, or the Tamuri Rajah, called the Zamorin by Europeans, is one of the most respected native chiefs. The males of the family are called Tamburans, and the females Tamburettis. It would be reckoned scandalous for the ladies to have any intercourse with their husbands. The Namburi Brahmins are generally the fathers of their children. The oldest man of the family by the female line is the Tamuri Rajah, and he pretends to be higher than the Brahmins, and inferior only to the gods; but these pretensions are not acquiesced in by the Brahmins. At present he has a revenue, but no authority. The town of Paniany, thirty-six miles south from the preceding, is inhabited chiefly by Moplays, or Mahometan descendants of Arabs, who settled here at an early period of the Mahometan religion. It is the residence of their Tangul, or chief priest, and contains forty mosques. They use a peculiar written character, totally different from the Arabic, that language being known to very few among them except the priests. They had no government, but were completely subject to the Hindoo chiefs, till Tippoo encouraged them to make the most wanton attacks on the Hindoos, and thus transformed them into a set of lawless, blood-thirsty ruffians, who have with difficulty been in any degree reformed by the subsequent rule of the British. The Tangul is still their spiritual head, who names the Imâm of the mosque, generally giving the appointment to the sister's son, or heir, of the preceding functionary. This shows, even among that race, a tendency to comply with the native customs of the country.

To the south of the British Malabar lies the small principality of Cochin, so named from a word signifying "a morass." It contains a considerable variety of valuable forest trees, which contribute greatly to the beauty of the scenery, and the picturesque appearance of the dwellings of the inhabitants.

In this province are many Christian villages, inhabited chiefly by the Christians of St. Thomas, which are generally well built and cleanly. A great number of Jews live about Cochin, of whom there are two classes, distinguished by the appellation of white Jews and black Jews. The white Jews are considered as later emigrants than the black, and of purer blood, the black being partly descendants of Hindoo proselytes, and partly of a mixed breed. They have a synagogue in the town of Cochin; but the greater part of them live in the interior. Trittoor, Paroor, Chenotta, and Maleh, are the chief settlements of the black Jews. The white Jews keep a historical record of their emigration, which they date as far back as the building of the second temple. Their first settlement was at Cranganor, where they continued a thousand years, and during that time were joined by many others who had heard of their prosperity; but at last, in consequence of intestine discord, a Hindoo prince, who was called to the assistance of one of the parties, destroyed many of them, and dispersed the remainder, a catastrophe compared to the sufferings of the Jews at Jerusalem as related by Josephus. They show a brass plate, on which an ancient grant of land and certain privileges from an Indian king, is inscribed in the Malabaric character, and in so old a hand as to be scarcely intelligible. The Rev. Dr. C. Buchanan caused a fac-simile of this plate to be engraved at Cochin, which is now deposited in the library of the university of Cambridge.[b] Among the black Jews the same zealous inquirer found several Hebrew books, partly printed and partly manuscript. Some of the tombs in their burial grounds are handsomely constructed. In building their houses it is a rule to leave a part unfinished, as an emblem of the desolation of Jerusalem, and to write on it words signifying "in memory of the desolation."[c]

The Rajah of Cochin maintained his independence to a later period than most of the other Hindoo chiefs. Tippoo was the first who compelled him to pay tribute, which he now does to the English. Having in 1809 made an attack on the latter, supposed to be instigated by a hostile European power, he was reduced to a more dependent condition, and his tribute augmented.

The city of Cochin was the station of the first Portuguese fortress in India, begun in 1503. The Dutch took it in 1663. Under them Cochin was a place of great commerce. This city contains a great many Protestants, in consequence of colonies planted, and conversions made, by the Dutch. It is on the sea-coast, in lat. 9° 57′. It is still a place of great trade in pepper, cardamoms, precious stones, teak wood, and other articles of export. Several vessels are built at it. The white and black Jews, Moors, and Parsees, have their own bazars. The town has a handsome appearance, and contains within it large plantations of cocoa trees, and other palms, which diffuse a delicious fragrance.

Cranganor, sixteen miles north from Cochin, is the place where the apostle Thomas is said to have landed from Aden in Arabia. Both the town and the Portuguese fort are now in ruins. It is still the seat of an Archbishop, under whom are forty-five churches.

The western coast from Cochin to Cape Comorin is occupied by the province of Travancore, which lies between the eighth and tenth degrees of north latitude. At these latitudes there is only one chain of the Ghauts, the western, and no elevated table land; the eastern Ghauts having terminated more to the north. This province, comprehending the continuation of the western Ghaut chain, is bounded on the east by the Carnatic.

[a] "6000 houses."—M. B.

[b] Buchanan's Christian Researches in Asia, 3d edition, p. 207—210.

[c] זכר לכורכן

Agriculture is conducted here on principles somewhat different from what it is in the Carnatic. No tanks are required for irrigation; the seasons always affording sufficient moisture for the cultivation of rice, which is called the wet cultivation, and is of considerable extent in this province. The principal dry cultivation is that of pepper, betel nut, and cocoa nuts. Inland trade is cruelly restricted by the exaction of duties at every stage of the transit of goods, passes being unknown, except for articles already farmed. There are taxes on Christian festivals, on nets and fishermen, and a capitation tax on all males from sixteen to twenty, except Nairs, Moplays, and artificers. The number subjected to this tax is 250,000. The British have had some obstacles to encounter in fixing the administration of justice in this province. The Hindoo law is the basis of procedure; but owing to the number of Christians and Mussulmans, that law will not universally apply. It makes the killing of a cow a capital crime. It sanctions the trial by ordeal, and other absurd practices. In one case, property which had been awarded by a judge to one of the litigants in consequence of his oath, was referred to an assembly of pundits by the Resident, before whom the cause had been brought by appeal; that property was found by the pundits to be due to the opposite party, because the man's oath had been rendered null by the death of a cow in his house within forty days! The trial by ordeal has even found its way among the Jews. One of them complained to the Resident that he had been obliged by a court of justice to put his hand in boiling oil, and, because he could not sustain it, lost both his cause and the use of his hand. The British functionaries are generally applied to by the Rajah, or by the Ranny or queen, the leading Tamburetti, to conduct the national affairs, on account of the great partiality and turbulence which so commonly attend the administration of native Dewans and other ministers. It is among the hills of Travancore that the Syrian Christians are most completely naturalized. Hindoo temples are so rare, and plain Christian churches so abundant, that a European traveller would scarcely believe himself to be in India. The customs with regard to the intercourse of the sexes, which we have already noticed under the head of Malabar in speaking of the Nairs, operate in Travancore to their full extent, and regulate the succession to the throne, and to property. The husbands of the Tamburettis, or princesses, have no influence in the state, and are sent back to their villages on the death of the Tamburettis to whom they have been married. This perverted system of domestic relations, together with the oppressive character of the government, has generated a peculiar turpitude of character in this country, shewing itself in the prevalence of an uncommon degree of idleness, treachery, and turbulence. The male offspring of the Tamburettis are the only legal heirs to the throne; but certain forms are indispensable in order to become Tamburettis. In remote times, the Tamburettis themselves were the sovereigns. But about the year 1740 the power was transferred from the princesses to their sons. Superstitious scruples, as well as political feelings, often contribute to perplex the royal succession, and though not now attended with actual turbulence, prove a source of difficulty which the British power always waits to see removed before it gives its sanction to the succession.

Travancore, the ancient capital, is twenty-seven miles N.N.W. from Cape Comorin. The present capital is Trivanderam,[a] in lat. 8° 29′, fifty-two miles from Cape Comorin. It is the usual residence of the Travancore Rajahs. The castle is extremely ill built. The royal palace is large and well built, in the European taste, containing a great variety of paintings, clocks, and other European ornaments. But the Rajah prefers living in a house of a more humble appearance, where he is surrounded with Brahmins. The town is populous, and in 1785 it had a garrison of 10,000 Sepoys disciplined in the European manner, 1000 Nairs, and 400 Patan cavalry. Now, however, the force at the Rajah's disposal must be much less considerable. There is a small sea-port seventy-eight miles from Cape Comorin, called Anjengo, near to which is Attinga, (named in most maps Attancal,) where the Tamburettis principally reside.

Cape Comorin, the terminating point of the Indian continent, is situated just at the boundary between Travancore and the Carnatic, and has come into view in our account of that province.

[a] Tiruvandaburam.—M. B.

BOOK XLIX.

INDOSTAN CONTINUED.

Island of Ceylon, the Laccadives, and the Maldives.

Leaving now the continent of British India, we shall give a description of some islands which form natural appendages to that country. The most conspicuous is the large and rich island of Ceylon; in which we have been told that the stones are rubies and sapphires, that amomum scents the marshes, and cinnamon the forests, and that the most common plants furnish precious aromatics. Elephants of the handsomest and most valuable kind run here in flocks as the wild boars do in the forests of Europe, while the brilliant peacock and the bird of Paradise occupy the place of our rooks and our swallows.[a]

This island has received different names at different periods with different authors. Cosmas, in the sixth century, calls it Sielen Diva, or the island of Sielen, from which we have in European languages Selan and Ceylon. But, as Ammianus Marcellinus calls the inhabitants Serandives, and as the Arabic name *Serandib* is a corruption of Selan Div, the latter must be traced to a very ancient period, and probably is contained in the *Simundu*, (which should be read *Silundu*) of Ptolemy. This term indeed has the syllables Palai preceding it; but these are merely the Greek word for "old," and should not be confounded with the name itself. Another Indian name Salabha, or "the rich island," may be recognised in the *Salikê* of the same geographer. But the more ancient Sanscrit name, Langa, and that which is now most used among the natives and their neighbours, Singala, were unknown to the ancient authors. Singala signifies the country of "lions." Some think that Sinhal-Dwipa, (or the "lion island,") is the origin of the term Sielendiva of Cosmas. It was called also *Taprobrane* by the older writers, a name unknown before the time of Alexander, and of uncertain application. Tapobon is a name which it receives in Sanscrit.

This island is situated between the parallel of 5° 56′, and 9° 46′ N. latitude, and between 79° 36′, and 81° 58′ E. longitude.[b] Part of its length lies due east from the coast of Coromandel, at a distance of thirty miles. Its form is ovate; its northern extremity being the most pointed, with the island of Jaffnapatam, of a very irregular form, appended to it. It is almost two thirds of the size of Ireland, containing a surface of 20,770 square miles. The sea-coast is low and flat, and encircled with a broad border of cocoa-nut trees, surrounded by rocks and shoals. The interior is filled with mountains, which are seen from the ocean rising in successive ranges; many of them beautiful and verdant, others huge, rocky, and peaked. The highest and most conspicuous mountain is that of Adam's peak.

In this country winter is unknown; the perennial summer is only diversified by the difference of a few degrees of temperature.

Over most of the island, and particularly the maritime provinces, the wind blows during a certain period of the year from the south-west, and a certain period from the north-east, the same monsoons which, under local variations, prevail over India; the south-west monsoon blows while the sun is north of the line, the temperature of the continent being then higher than that of the ocean. This continues from the end of April to the beginning of November. The period of the other monsoon is when the sun is to the south of the line, when the ocean, taken along with the southern part of Africa, is of a higher temperature than the Indian continent. The difference of temperature being less than in the first period, the duration of this monsoon is shorter than the other, beginning in November, and ending in March. The south-west wind is felt generally over the island, but the north-east wind does not, during half its duration, reach across the mountains to Columbo on the west coast. The proportion of rain which falls is great, most particularly among the mountains, and on those parts of the coast which are most subjected to the influence of the monsoon. The rains are periodical and extremely heavy, two or three inches often falling in the course of a day. At the northern extremity, and along the east coast, the rainy season begins in November, lasting about two months with great violence; the rest of the year is dry, and rarely visited by scanty showers. On the west coast, most rain falls about the setting in of the south-west monsoon, but it is not so heavy nor so constant here as on the opposite side; the dry season, too, is more liable to be interrupted by showers. Hence the west coast is seldom parched, and exhibits at all times the most inviting aspect to strangers. The seasons among the mountains participate more of those of the opposite coasts in different places, in proportion to their local situation and aspect. Rains are frequent in the interior, hence the country is well watered. The heat varies in different places. The west coast is remarkable for equality of temperature, exceeding in this respect any other part of the world, except a few small islands at a great distance from land, such as St. Helena and Ascension island. The mean temperature is about 78°, and the atmosphere is exceedingly moist. The east coast, about Trincomalee, is remarkable for intense heats, the mean temperature of the hot months being 82.8. Among the mountains, the temperature is generally cooler than might be expected, and the vicissitudes are greater. The mean

[a] Linnæus, Musæum Ceylanicum, Præfat.

[b] Lat. 5° 50′—9° 51′ N. Long. 79° 50′—82° 10′ E. (*Ed. Encyc.*)

annual temperature of Kandy is about 73. 5.[a] Ceylon suffers much less from violent storms and hurricanes than islands in general, especially between the tropics. Instances of this kind, however, have occurred. In 1819, at the foot of the mountains in the south-eastern part of the island, there was a violent thunder shower, with wind and hail, which unroofed the houses in an instant, tore up many trees, and broke others across which were fourteen feet in circumference.[b] The most healthy parts of the island are the south-west coast, and the loftier grounds of the interior situations, which coincide in being well ventilated, and refreshed with frequent showers. The most unhealthy regions are the wooded parts between the mountains and the sea, in all directions except to the south-west. These parts resemble the Terriani in the north of Indostan. The lower mountainous districts, and the northern and the eastern shores, hold in this particular an intermediate character. Trincomalee is never sickly while subjected to the north-east wind, coming directly from the sea; but it changes for the worse during the south-west winds, which blow over an extent of a low unwholesome territory. The diseases are in general those which prevail in hot climates. Elephantiasis, and various cutaneous affections, are very common among the natives. Dysentery is more frequent than in India, and is formidable from its fatality, and the rapidity of its course. Palsy and insanity are frequent both among the natives and among Europeans.

The principal river is the Mahawellé-ganga, which, winding extensively among the highest of the mountains of the interior, and supplied with many tributaries, receives all the water which falls on that region, and empties itself on the east coast, between Trincomalee and Batticaloe.[c] It is only partially navigable. Shallows, rocks, and rapids, interrupt the navigable communication between its higher parts and the sea. The Kalané-ganga, which runs from Adam's Peak in a westerly direction, falling into the sea at Columbo, though of much smaller dimensions, is more important, on account of its being navigable for boats for three fourths of its course. Hence it is much used for inland carriage, and is likely to be more so in future. Perhaps by an artificial communication with the navigable part of the Mahawellé-ganga, the general internal communications may be materially facilitated.[d]

The whole of this island consists of what mineralogists call primitive rock, chiefly granite and gneiss, with some quartz rock in large veins, hornblende, and dolomite rock, which last is both in veins and imbedded. Limestone is confined to the province of Jaffnapatam, and is of the shell kind, and mixed with coral rock. Grey and blackish sandstone is of general occurrence along the shore. This island is remarkable for its richness in gems, and for the variety of its minerals. The primitive rock contains ores of iron and manganese, the former of which is worked by the natives, the species being those called red hematite and bog ore.[e] Rock crystal, amethyst, prase, and cat's-eye, the latter particularly fine, topaz, schorl, common garnet, and the variety of corundum called the cinnamon stone,[f] are also found. This last is an interesting mineral. Ceylon is richer in zircon than any other part of the world. It has long been celebrated for rubies of different species. The country contains several nitre caves.

The vegetable productions of Ceylon are valuable. The cocoa-nut holds the first rank for utility, from its agreeable fruit, the oil which it yields, the toddy produced from it, and its leaves universally employed for the walls and roofs of the dwellings. The *borassus flabelliformis*, or palmyra, is also valuable, its leaves being used for writing on all over India, and its wood durable, and not liable to the devastations of the white ants. In the north part of the island the sweet fruit of this tree forms a leading article of food among the poorer inhabitants. The sago tree, the large talipot palm,[g] the leaves of which serve for umbrellas, two species of bread fruit, the *Artocarpus integrifolia* and *incisa*, the singular *ficus religiosa*, or banyan tree, the tamarind, the cashew and areca nut trees, yield their respective fruits. There are two annual crops of oranges, and for two months in each season that fruit is to be obtained in a good state for eating. They are of a delicious flavour, but different from those to which we are accustomed, their colour, when ripe, being green instead of yellow. Guavas, papaw, pomegranate, bamboo, sugar cane, pepper, tobacco, and various articles of export, grow here. Very little grain is cultivated besides rice, of which they have four kinds. There is not a sufficiency, however, for the inhabitants, so that a considerable importation of this article is rendered necessary. Of all the vegetable productions of the island, that for which it is most celebrated is its cinnamon, the bark of the *Laurus cinnamomum*, called by the natives coorundoo. On this the riches of the island in a great measure depend; therefore the cultivation of the trees, and the gathering of the bark, are objects of careful attention. In April, soon after the fruit is ripe, the business of decortication begins. May and June are reckoned the most favourable months, the three following not so good, but November and December are favourable, and are called the little harvest. The labourer first selects a tree which appears to him ripe, then he ascertains it by striking his hatchet obliquely into a branch; if, on drawing it out, the bark separates from the wood, the cinnamon has attained maturity; if not, it must remain. He cuts down a number of shoots, from three to five feet long, and three fourths of an inch in diameter, carries his load to a hut or shed, and, with the assistance of a companion, strips off and cleans the bark. The cinnamon tree flourishes only in one small district of the island, being confined to the south-west angle, from Negumbo to Matura. There is none on the western side beyond Chilau, nor on the eastern side beyond Tengelle. Within this range the nature of the soil, and the warmth, moisture, and steadiness of the climate, contribute to cherish it. The largest plantation is near Columbo, and is about twelve miles in cir-

[a] Dr. John Davy's Account of the interior of Ceylon, 1821, p. 68.
[b] Ibid. p. 73.
[c] Batacola.
[d] Dr. Davy.
[e] Bog ore is properly an alluvial deposite.—P.
[f] The cinnamon stone is ranked by Jameson as a sub-species of garnet.—P.
[g] Corypha umbraculifera.

cumference. In some inland places it grows without cultivation, but of inferior quality. The cultivation of cinnamon was the result of the experimental enterprise of the Dutch governor Falk, who presided in Ceylon for thirty years before its conquest by the English. He met with great opposition from the prejudices and imagined interests of the natives, some of whom slily attempted to thwart his endeavours by sprinkling the plants in the evening with hot water. His exertions were thus a little retarded, but ultimately succeeded. The quantity of cinnamon annually sent to Britain amounts to 368,000lbs. for which the East India Company pays to government (as this island is immediately subject to the king) 60,000*l.* sterling, and they carry it home at their own expense.[a] A great quantity is used by the slaves in the South American mines as a preservative against noxious exhalations, and it is dispersed through the different countries of the east. The wood of the tree has no smell, and is chiefly used as fuel.

All the larger animals of Ceylon are common to it with continental India; subject to accidental modifications in the qualities of the respective breeds. Some of the continental species are not found in the island. The elephant stands at the head of the class of its quadrupeds. Of this animal there are two varieties,—one with very long teeth, called *alleia*, and another, which has either very short teeth, or none at all; these are called *aëta*.[b] Elephants are caught in Ceylon, chiefly by such snares as have been described in Book XLVI.[c] Of these there is one at Kotawy on this island, which requires 300 men to guard it when elephants are caught. On the first day of a hunt, Mr. Cordiner mentions that they had caught twenty, which he reckoned a small number; but he thought that the operation might be rendered much more speedy by additional expedients.[d] On another day sixty were secured. When caught, an elephant is tamed in the course of eight days. They are conveyed to Jaffnapatam, where they are sold by auction before they are transported to the continent. The elephants of Ceylon are generally from ten to eleven feet in height. The feet, and some other parts of the flesh of this animal, are very palatable. The Kandians are in the habit of catching them sometimes by laying nooses for their feet, sometimes by chasing them on tame elephants, throwing ropes round the neck and feet of the wild animal, and then beating him into subjection. The uses to which this noble animal is applied in Ceylon are, as elsewhere, innumerable. Besides carrying all sorts of burdens in peace and war, they are employed in thinning plantations, or clearing away forests, which they do by pulling up the trees with their trunks, with as great facility as a man pulls up stocks of cabbage. The neighbourhood of Matura, in the southern part of the island, is the place where those are chiefly caught that are intended for exportation. The regular hunts take place once in three or four years. The Indian buffalo is also found in a wild state in Ceylon; and when tamed, employed in labour. It is a different animal from the buffalo of the south of Europe and Egypt; being inferior in size and stature even to the English ox, and the horns bending back. They shew their community of nature with the large buffaloes, by having the same instinct to roll in mud, and remain immersed in water during the heat of the day. In the wild state they are fierce, and rather dangerous to meet in travelling. Common oxen of various colours, but mostly black, with a hump on the shoulders, are reared in considerable numbers, and employed in labour. Both these and buffaloes are liable to very destructive epidemics. Hogs are plentiful, and much eaten by the Dutch and Portuguese. Sheep and goats are not native here, and few of them are reared, though they thrive very well, especially about Jaffnapatam. The horse is not a native of Ceylon, and the only ones in the island are a few which have been imported for the pleasure of the European inhabitants. Some have been bred at Jaffnapatam, and the small island of Delft. They were first introduced there by the Portuguese, who called the islands *Ilhas de Cavales*.[e] The woods abound with deer, of which a beautiful small species, not larger than a hare, is very common. It is called the moose deer, and nearly corresponds with the *Cervus guineensis* of Linnæus. The royal tiger is not found in Ceylon; but a smaller species, called *Cheta*, spotted like the leopard, is numerous. Monkeys swarm as they do in Indostan, and among others the white bearded and the black bearded species. The musk animal, called by naturalists *Moschus memana*, and the jackal, are among the quadrupeds which people the island. Its birds form a more numerous class. Domestic fowls, ducks, and geese, are plentiful at the European settlements. The jungle fowl, which resembles the pheasant, is in great abundance. Green pigeons of beautiful plumage, and forming a delicacy for the table; snipes, green parroquets in considerable variety, peacocks, fly-catchers, tailor-birds, kites, vultures, crows, and numerous others, either peculiar to the tropical regions, or more or less allied to species familiar in Europe, abound. Reptiles of various sizes, from the most minute lizard to the largest alligator, are in great variety, and among others the house-lizard, which is the largest animal that can, like a fly, walk in an inverted situation, a mechanism accomplished by a muscular power in the webs of the feet, by means of which it can cling to any surface by taking advantage of the atmospheric pressure, like a leech fixing on the skin, or a child sucking the mother's nipple. When a lamp is hung on a house wall, it is soon surrounded with lizards in quest of flies. Snakes of different sizes and species abound here, as in Indostan; and in this island Dr. Davy has lately made some interesting experiments on the operation of their respective poisons.[f] Like all warm countries of luxuriant vegetation, it swarms with insects in every direction. That valuable product of this class of the animal creation, honey, is abundant in Ceylon, and is commonly

[a] Cordiner's Description of Ceylon, vol. I. p. 46, published in 1807.
[b] Asiat. Register, 1800. Miscell. Tracts, p. 3.
[c] See p. 441, *supra*.
[d] See Cordiner's Account of Ceylon, vol. I. p. 213—247, where an animated account of an elephant hunt is given, accompanied by a plate of the snare

[e] "The horses of Ceylon are a fine race. When young, they leave them at large on three little islands, which the Portuguese named, from this circumstance, Ilhas de Cavales, [dos Cavallos ?] Horse Islands."—M. B.—P.
[f] Dr. Davy's Account of the interior of Ceylon, p. 89, 90.

used for seasoning and preserving meat, as salt is used in other countries.[a] There are many kinds of ants; the most remarkable are the destructive white ant, the great red ant, which builds its nest on trees by connecting together a number of leaves with a glutinous cement;[b c] the common red ant, which abounds in houses, and several others, red and black. A curious advantage is taken of the combative instincts of the ants, all the species of which are enemies to one another, so that one exclusively occupies any particular haunt. The white ant, being the smallest, is destroyed by the red ant. Therefore it is a common practice to strew sugar on the floors of houses to attract the larger species, and thus procure the extinction of the white ant. The grasshoppers are extremely curious; some resembling pieces of straw awkwardly joined together; others the branches of trees; while the wings of others bear a perfect resemblance to the leaves of trees. There are some very large spiders; one of them, which has legs four inches long, and the body covered with hair, is said to be poisonous in its bite, but fortunately it is rare.—One of the most troublesome animals of Ceylon is a small leech, which, if not peculiar to this island, has no where else attracted so much attention, though it is perhaps the same animal which is mentioned by Mr. Marsden as found in Sumatra. It is confined to the moist parts of the island, which are of moderate elevation, and visited by frequent showers. In dry weather it retires into the shade of bushes and jungle, but during rain, it abounds over every part of the surface, and fastens on the legs and feet of travellers in such enormous numbers, and with such perseverance, that it is impossible to keep them off. The only preventive is to have the limbs well covered with boots and trowsers. Smearing them with oil, especially castor oil, or the juice of acrid plants, such as tobacco, answers tolerably well, as long as it is not removed by the friction and moisture in travelling; but in general it is not a permanent defence. This leech is smaller than the medicinal species, and some varieties of it are extremely minute. Its colour is brown, and its texture to a considerable degree transparent. It tapers from a broad flat tail to a fine pointed mouth, and can stretch itself out as fine as a thread, so as to pass through very small openings. The bites, if properly attended to, are easily healed; but if neglected, they occasion a great loss of blood, and degenerate into tedious ulcers; hence some have pronounced this animal to be the cause of more deaths than any other on the island.[d]—The lakes and rivers abound with fish, but generally of small size. The common fishes of the Indian Ocean are found on the shores. Many cowries are got here, which pass as a circulating medium of low value in petty traffic through the whole of India.

The marine animal most deserving of our notice is the oyster which yields the pearl, and which is taken for the purpose of procuring that valuable article. One of the most celebrated and productive pearl fisheries is on the west coast of Ceylon, off the Bay of Condatchy, about twelve miles south from the island of Manaar. This bay is the great rendezvous for the boats employed, and all the persons concerned in it. This part of the country is sandy, and scarcely inhabited at all excepting on these occasions. But during the pearl fishery it branches out into a populous town, with many streets a mile long. The most active persons in erecting the huts are the Mahometan natives of the island. None of the Singalese are divers, which some ascribe to the timidity of their character; but many of them resort to the place as to a fair, particularly fishermen to supply the multitude with fish. About the end of October, in the year preceding a pearl fishery, during a short interval of fine weather, an examination of the banks takes place, a few oysters being taken for a specimen. The banks extend over a space thirty miles long, and twenty-four broad, and are fourteen in number. The largest bed is ten miles long and two in breadth. When the fishery is determined on, advertisements are circulated for all concerned to repair to the place on the 20th of the succeeding February, when the boats come from Jaffna, Ramisseram, Nagore, Tutakoreen, Travancore, Kilkerry, and other parts on the coast of Coromandel. The banks are about fifteen miles, (or three hours sailing,) from the shore of Condatchy. The pearl oysters are all of the same species, but vary in their qualities, according to the nature of the ground to which they are attached, and the appearance of the numerous and often large zoophytes which adhere to the outside of their shells. Their number on the banks varies considerably, being sometimes washed away by the current of the tide, and sometimes buried in the sand deposited from the water. The pearls are in the fleshy part of the oyster, near one of the angles, at the hinge. Each generally contains several pearls. The fishery is rented to one individual for a stipulated sum, two thirds of which are paid in advance. In 1804, the renter brought with him a large family, with thirteen palanquins, to each of which thirteen well-dressed bearers were attached. He is allowed 150 boats fishing for thirty days. The boatmen and their attendants, to the number of 6000, are roused a little before midnight with immense bustle, and, after their ablutions and incantations, set sail. About half past six in the morning the diving begins. A kind of open scaffolding is projected from each side of the boat, from which the diving tackle is suspended; consisting of three stones fifty-six pounds in weight on one side, and two on the other. The diving stone hangs by a rope and slip knot, descending a little way into the water. In the rope just above the stone, there is also a strong loop, to receive, like a stirrup, the foot of the diver. The latter puts one foot in the loop, and the other in a basket formed of a hoop and net-work. When duly prepared, he grasps his nostrils with one hand, and with the other gives a sudden pull to the running knot, and instantly descends; both the rope of the stone and that of the basket follow him. The moment he reaches the bottom he disengages his foot from the stone, which is immediately drawn up, to be ready for the next diver. The diver at the bottom throws himself on his face, and collects every thing he

[a] Texeira, Hist. Persic. B. I. chap. 35.

[b] "A species of black ant makes very large nests on the branches of trees."—M. B.—P.

[c] Valentyn's Description of Ceylon, in Dutch, p. 54.

[d] Dr. Davy's Account, &c. p. 102, 105.

can lay hold of into his basket. When ready to ascend, he gives a jerk to the basket-rope, and is speedily hauled up by the persons in the boat; using in the mean time his own exertions in working up by the rope, he arrives at the surface a considerable time before the basket. He swims about, or remains at rest, laying hold of an oar or rope, till his turn comes to descend again. Some of the divers perform the dip in one minute; a minute and a half, or two minutes, are assigned as the utmost that any one remains under water. The basket is often so heavy as to require more than one man to haul it up. The shark-charmers form an indispensable part of the establishment. All these impostors belong to one family. The natives will not descend without knowing that one of them is present in the fleet. Two are constantly employed, one in the head pilot's boat, and another performing ceremonies on shore. Sharks are often seen from the boats, and by the divers while in the water, but an accident rarely occurs. This prejudice operates as a protection to the oyster banks from plunder at other times.

Where the bed is rich, a diver often puts upwards of 150 oysters into his basket at one dip; when they are thinly scattered, sometimes no more than five. After diving, a small quantity of blood usually issues from the nose and ears, which is considered as a favourable symptom, and they perform the operation with greater comfort after the bleeding has commenced. They seem to enjoy the labour as a pleasant pastime, and never complain of fatigue unless the banks are poor in oysters. Two divers are attached to each stone, and go down alternately. The period allotted for this operation continues from five to six hours. About one or two o'clock, at the setting in of the sea breeze, on a signal given by the head pilot, the fleet sets sail for the shore, and arrives about four or five, amidst an immense concourse of people. They never fish on Sundays, all the pilots, and many divers, being Romish Christians, and the day of rest is also convenient for the Hindoos. Each diver has a fourth part of the oysters which he brings up, from which, however, he has various claims to satisfy. He sells his share on the spot to the numerous adventurers who resort to the place. In a successful fishery, each man carries home, at the end of the season, forty or fifty pagodas. A boat has been known to land in one day 33,000 oysters, and in another not more than 300. Those belonging to the renter are piled up in inclosures formed by palisades, and the opening of them does not commence till the fishery is considerably advanced; adventurers on a small scale open them when they buy them, or on the following morning. By some, the oysters are now thrown away, by others they are left to putrefy for the purpose of obtaining with greater certainty the remaining pearls, particularly those of a small size. Two days are generally required for the putrefaction. Many precautions are employed to prevent the secreting of pearls, but not with complete success. When the pearls are separated from the putrid flesh of the oysters, and from the sand along with which the mass has been agitated in boats for that purpose, they are sorted into sizes, by being passed through sieves or saucers full of round holes, those with the largest holes being first used, and the others in succession. The large ones are examined, to see if they contain any blemishes. They are then drilled with great skill, though by very rude and simple tools. Many of the native merchants, who resort hither from Madras and other parts, are extremely wealthy, and make a great display of opulence in their personal appearance, their retinue, and the quantity of specie which accompanies them. Pearls sell at a higher price in the market of Condatchy during the fishing season, than in any other part of India. No fishery took place between the years 1768 and 1796. The fishery of the latter year was rented by some natives of Jaffnapatam at L.60,000 sterling, and they cleared three times that sum by the adventure. In 1797, the net proceeds were L.144,000, and in 1798, L.192,000. That of 1799 only yielded L.30,000. There was a fishery off another part of the coast, Chilaw, in 1803, which yielded L.15,000, and one at Aripo, in 1806, which yielded L.35,000. The fisheries, on the whole, present an amusing scene, from the number of strange characters, deformed persons, jugglers, dancers, tumblers, mechanics, and retailers, who resort to the place from the remotest parts of India.

This whole island is but thinly inhabited, and this is more the case with the Kandian than with the maritime provinces. In 1814, when a census was taken of the old English possessions, the population amounted to 476,000 souls, and it is believed that the population of the whole island does not exceed 800,000, or about thirty-eight to the square mile.

The inhabitants may be divided into the aboriginal race, and naturalized foreigners. Of the former, who are called Singalese, the inhabitants of the interior exclusively consist. The greater part of the naturalized foreigners are Malabars and Moors. The Malabars are confined chiefly to the northern and eastern parts, while the Moors are scattered over all the maritime districts. The Kandians or Singalese of the interior, and those who are mingled with the other classes in the low country, seem to be of one stock, and probably exhibited, three hundred years ago, one uniform character. But now there is a marked distinction in their language, manners, and customs, varying in degree according to their proximity to the European settlements. The Kandians, therefore, may be considered as the living examples of the ancient national character, and their state of political subjection will now probably operate a gradual alteration of their character. Their features differ very little from those of the Europeans. Their colour varies from light brown to black; they have almost universally hazel eyes. In a very few the eyes are grey, and the hair red. They are inferior in size to the Europeans, but larger than the lowland Singalese. They are of a stout make, have capacious chests, but are more remarkable for agility and flexibility than for strength of limb; and capable of long continued rather than great exertion. They are divided into castes, but they have not the ridiculous pride of caste which prevails in India. A Singalese will not refuse to eat in company with any respectable European. The leading divisions of their castes are four. The first two are the royal caste, and the Brahminical, which comprehend a very small proportion; the other two are the Wiessa, and the Kshoo-

dra; the former of whom comprehend the cultivators and the shepherds. The Wiessa cultivators are higher than the shepherds. They so far intermarry that a man of the higher rank may take a wife from the other, but a man of the shepherd caste is not allowed to take one from the class of cultivators. To this class belongs the savage race called Weddahs, or Bedahs, who inhabit the extensive forests on the south-eastern side of the island. Their appearance is completely wild, and their habits disgusting. Some of them live in villages: another set of them, who have no intercourse with the village Weddahs, being both feared and hated by them, live in huts made of the bark of trees, and eat the flesh of wild animals, with a little maize and roots. They live in pairs, only occasionally collecting in greater numbers. They seem ignorant of all social institutions. It appears that they do not distinguish one another by proper names; and their arts consist of the making of bows and arrows, rude cords from tough vegetable fibres, scratching the ground, and sowing a few seeds. They do not count beyond five. They believe in demons, and offer them homage, without entertaining any notion of a beneficent Deity. Dr. Davy, who witnessed one of their scenes of amusement, which seemed to be their nearest approach to dancing and singing, says that they began by jumping about with their feet together. As they became warm, their hands were employed in patting their bellies: becoming more animated, they clapped their hands as they jumped, and nodded their heads, throwing their long entangled locks from behind, over their faces. They generally acknowledged some Singalese of rank of the adjoining country for their chiefs, and these now and then used to call them together to renew their acquaintance and retain their influence. Dr. Davy mentions as belonging to the Goewansé caste, or that of cultivators, a sort of Singalese Christians, who have been lately discovered in the interior, viz. at Wayacotté in Matelè, and at Galgomua in the seven Korles, about 200 in each village, who worship the Virgin Mary, bow before a crucifix, believe in a purgatory, and baptize, marry, and bury according to the rites of the church of Rome. Their only minister is a man who cannot read, and can only repeat a few prayers. They are said to visit occasionally the temples of Buddha. These must be descendants of the numerous converts made by the Portuguese, while they were masters of the interior. A few years ago, they, for the first time, received from an English clergyman a copy of the New Testament. The fourth, or lowest caste, is called Kshoodra or Sudra, and is subdivided into numerous classes, at the head of whom the Moormen or Mahometans are placed. These are a stout, active, shrewd, enterprising race, and monopolize the trade of the country. In appearance and manners they hardly differ from the Singalese. Some have land, and were obliged to appear when required, with their bullocks, to carry the king's rice to the store. There is a class of toddy drawers, but their number is small, as the religion of the country proscribes the use of intoxicating liquors. There is a class of artizans in wood, stone, and metals, who were all obliged to work for the king without compensation, except the carpenters and sculptors, who, when employed, were allowed provisions, because the materials in which they wrought afforded no opportunity for purloining. There is a class of potters, who are numerous, and much employed: for after any feast, at which people of different castes have been entertained, the earthen vessels are all broken, lest any person should undergo the disgrace of afterwards drinking out of vessels which have touched the lips of an inferior. The caste of barbers is little employed, as each man shaves himself, but they have a ridiculous religious ceremony to perform, the shaving of Buddha; the barber merely makes the appropriate motions with a razor, without coming in contact with the image, which is all the time behind a curtain, while a priest holds up a looking glass before it. This duty they perform as a condition for holding the land on which they live. There is a caste of washermen for furnishing white cloths to spread on the ground, line rooms, and cover chairs. The others, of whom as many as twenty-one are enumerated by Dr. Davy, are all in like manner distinguished by the duties they had to perform to royalty, in consideration of the lands which they held.

Beneath all these, there used to be two sets of outcasts, one of them called Gattaroo, which consisted of persons degraded, and cast out of society by the king, for infamous conduct; the dreaded sentence being, "Let the offender be exempted from paying taxes, and performing services, and be considered a Gattaroo." The other was called Rhodees, who were descended from persons cast out of society for eating beef after it was prohibited. They are not allowed to live in houses built in the usual way, but only in sheds open on one side. They are obliged to go out of the way, or turn back, when a person of higher caste meets them on the road. Yet the Rhodees are a robust race, and their women particularly handsome. These are less shunned than the men. They ramble about the country, telling fortunes.

The government of the kingdom of Kandy in the interior, lately abolished, was a regular and somewhat limited monarchy; it was accompanied, in some degree, with that rapacity on the part of the sovereign and his ministers, which characterizes the native governments of the Brahminical nations of Indostan, in which a transference even to the harsh rule of the Mahometans brought with it some advantages to the people. The succession was hereditary, but conditions were imposed on the sovereign on his receiving the regal dignity; and when cogent reasons appeared, the succession was liable to be modified without tumult or bloodshed. The atrocious character of the last king was rather a glaring exception, than an exemplification of the usual character of the sovereigns. It was necessary that the queen should be of the Soore Raja-wansè. Queens were therefore procured from the continent of India, generally from the state of Madura. The marriage ceremony was long, complicated, and extensive, but attended with an extraordinary festivity and relaxation of court discipline. The Kandians have four great annual festivals; one at the new year, which is in April; a second in honour of Vishnu and the gods; a third, called the feast of the fortunate hour, celebrated for the prosperity of the kingdom; and the last in honour of the completion of harvest, and called the feast of new rice,

The manner in which these festivals are conducted is creditable and decorous, without riot or disturbance, and, as onlookers have testified, without any instances of drunkenness.[a] The public exhibitions are quite free from the indecency and licentiousness which characterize those on the continent of India, having nothing to shock the feelings of the most modest and refined.

The code of legislation seems to have consisted of a sort of common law very well adapted to the social state of the people. They had not the code of Menu, but only a few of its precepts scattered through their books of religion. When an instance of suicide occurred, or when the perpetrator of a murder could not be discovered, a fine was inflicted on the village, unless the crime had occurred in the jungle, or at a distance from the village. No magistrate or judge, except the king, had the power of passing sentence of death. Neither suicide nor murders seem to be common. An elderly man, when questioned on the point, could not recollect of having heard of more than five instances. A sort of ordeal was sometimes employed. When two persons took contrary oaths, calling down the vengeance of heaven on the perjured, the party who afterwards first sustained any personal or domestic calamity was concluded to be the perjurer. Plunging the hand in boiling oil was also practised, but disapproved of by the intelligent. The hardest laws were those against insolvency. The debtor was doomed to slavery, along with his family, till his debt was paid, without any regard to distinction of caste. The slaves, however, are kindly used; their whole number in the interior is supposed to amount to 3000. Regular usury was not allowed, but an agreement was sometimes made that the sum borrowed should be returned augmented by one half, at whatever future time it was repaid. The Moors take twenty per cent. of annual interest. The land was the property of the king, but held by the possessor on easy terms, and sometimes, when appropriated to a temple, exempt from rent or civil service.

The people profess the religion of Buddha, which has by some been called atheistical, because it allows of no Creator existing before the universe, and pays worship only to the souls of good men, who have suffered a transmutation resembling deification. In other points of view we find as much fanciful detail on the history of heaven, earth, and distant worlds, and as much imagery of supernatural powers, as in the generality of eastern systems. They believe in the transmutation of men into gods and demons, and of gods into animalcules. Death they consider as a mere change of form. These changes they hold to be infinite, and bounded only by annihilation, which they esteem the acmè of happiness. The universe they consider as eternal, though in a constant state of alteration. The learned among them are as familiar with the details of the system as with the events and interests of their own villages or families. They believe in beings called Brachmeas, who are of greater purity than the gods. These vary in rank, and reside in different departments of the heavens. They have infernal regions, of a heat varying in intensity with the guilt of the individuals doomed to dwell in them. The term Buddha is considered by learned etymologists as meaning wisdom, and is applied to persons of extraordinary endowments and destiny, a certain number of whom is fated to appear in each grand period of the world. One of these, the fourth in order, is the present object of adoration. This being had the power of assuming any form, and of multiplying himself to infinity. He now exists in a mysterious abode or state, which they call Niwanè. The Buddhists of Ceylon have numerous sacred writings, which are extremely obscure, and are reproached for that quality even by the Brahmins. At Kandy there are two regular colleges; and the religious establishment is as regularly organized as in any country whatever. The priests are dressed in yellow, and live in a state of celibacy, but they are permitted to resign their office, and may then marry. Their books are greatly venerated. They are not touched without a preliminary obeisance: a person will not sit down where a book is present, unless it is in a higher situation than himself. The priests do not worship the gods, being reckoned their superiors. When they preach, they invite the gods to be of their audience. They are, like Buddha, entitled to be worshipped; and no person, not even a king, must sit in their presence. They were the only persons allowed by the Kandian government to go beyond the bounds of the kingdom, and often wandered over the whole island. The religion of Ceylon, uniting the worship of the gods with that of Buddha, and under the same names, (such as Vishnu,) which are used by the Brahminical Hindoos, shows either an original connexion or an accidental incorporation of the two systems. They say that the Brahminical system prevailed before Buddha appeared to revive their own religion, then extinct, which was 600 years before the Christian era.

The Singalese language, like the other Indian dialects, has its origin in the Sanscrit, mixed with what is called the Pali. It is, however, a peculiar language, and not, as some have asserted, the same with the Siamese. It has also a peculiar written character, unknown in any other country.[b] It is always written from left to right. Among this people language is almost the only subject that is carefully studied. There are various dialects appropriated to different castes and to different occasions. Reading and writing are general acquirements among the men, but form no part of female education. Their books are written on talipot leaves, which are duly prepared, cut to a uniform shape, and connected together into books by a string passing through holes in the leaves. They are fond of intricacies and displays of art in language. One poem is considered as an extraordinary effort of genius, because it admits of being read from left to right, up and down, and various other ways, making sense in each. The compositions which approach nearest to poetry are addresses to the chiefs, expressive of respect, or soliciting them for favours. They have seven tunes to which they modulate these compositions in the recital. Their instruments of music are of rude simplicity, and most of them noisy, consisting of different sorts of drums, a wind instrument re-

[a] Dr. Davy's Account of the interior of Ceylon, p. 177.

[b] See a specimen of it in Mr. Cordiner's Description of Ceylon, vol. I. p. 130.

sembling a clarionet, and a fiddle of two strings.[a] Having no numerical characters of their own, they use the Tamul figures, which follow the decimal series. The currency consists of copper, silver, and gold coin. All the last consists of Indian pagodas. In the arts of drawing and painting they are far behind. They are extremely fond of lacquer painting, which they perform with a good deal of skill and taste, producing a pretty and brilliant effect. In statuary, as applied to the fabricating of representations of Buddha, they have acquired excellence by practice. Such representations are in request in every temple. They have the art of casting small figures very neatly; and there are good specimens of large ones in the temples. Their architecture is chiefly displayed in their temples. Their dwelling houses have a simplicity suited to a climate which requires no houses excepting as shelter from rain, and a shade from a scorching sun. The floors of their houses are of clay, plastered with cow-dung, an article conducive to cleanliness and to the keeping down of insects. The houses of the chiefs are in the form of square courts built of mud, roofed with tile. This last circumstance serves to distinguish them from the dwellings of the people, who are allowed nothing but thatch.[b] They work in gold and silver with considerable ingenuity and taste, although their tools and apparatus are all portable, and characterized by a simplicity unknown in Europe. Their pottery is coarse and unglazed, but perfectly well adapted for its appropriate uses. The only weaving is of the coarse strong cotton cloth which is worn by the common people. Agriculture is very much respected by them. No manure is used, which is a great drawback from the productiveness of their labours. The land, when exhausted, is allowed to overrun with weeds and jungle, which it soon does, and this is afterwards cut down and burned on the soil, to qualify it for bearing useful crops. The implements of husbandry are remarkably simple.[c]

The Singalese of the interior are rarely collected in large villages. The only group of this kind seems to be Kandy, the capital of the country. They live either in very small villages, consisting of a few houses, or in detached habitations. These are usually in low sheltered situations, near the rice fields, as they have a particular aversion to wind. The men are engaged in the more laborious occupations of ploughing and banking, the women in weeding and reaping. Their grain is ground at home in hand mills. The Singalese rise at dawn, and go to bed about nine or ten at night. They sleep on mats, generally with a fire in their room. Cakes of cow-dung constitute their ordinary fuel. Their principal meal is at noon, and consists of rice and curry. Though not prohibited from the use of beef by their religion, they abstain from it because it was forbidden by one of their kings; another instance in which Brahminical ideas and customs have become intermingled with their original code of faith and practice. Though unacquainted with what we denominate conviviality, they are a social people, fond of conversation and mutual visits. The men and women form separate circles, and are never seen mixed in society. They are courteous and ceremonius, but, like other Asiatics, unacquainted with all the sentiments which constitute gallantry. Matrimonial alliances are fixed by the parents alone. Concubinage and polygamy are contrary to their religion, but are both indulged, particularly polygamy; and here, as in Thibet, a plurality of husbands is much more common than of wives. This practice prevails among all castes and ranks, and the joint husbands are always brothers. Matrimonial infidelity is not uncommon, and easily forgiven, unless when aggravated by a low attachment on the part of the female. But the manners of the people are by no means marked by extreme licentiousness. They have their own notions of propriety and decency, which no one's inclinations allow him to violate. In the relation of parents and children they appear particularly amiable. A woman has seldom more than four children, a circumstance which probably arises from the period of suckling being so long protracted, which it often is to four or five years. The children are named when they are able to eat rice, the name then given being called "the rice name." Their family attachments are strong. During the late rebellion, instances occurred of fathers giving themselves up as soon as they knew that their families were taken. Children are never exposed, except in some of the wildest situations, and under the pressure of necessity. They do not, as some have asserted, turn their sick relations out of doors to die in the fields; though, in order to save their houses from pollution, they sometimes remove them to an adjoining shade to breathe their last. The care which they take of the bodies of the dead is very great, many ceremonious attentions being bestowed preparatory to the ceremony of burning. Low caste people not being allowed to burn their dead, bury them with little ceremony, with the head to the west. In civilization this people is nearly on a par with the Hindoos. In intellectual acquirements they resemble the state of Europeans in the dark ages. They are attentive to natural objects, and acquainted with the names and qualities of the minutest plant that grows within their district. In courtesy they are equal to any nation; in character they are low, tame and undecided, with few prominent virtues or vices; their natural affections are strong, their passions moderate, and their moral feelings weak.

The Singalese of the provinces which have been for some generations habitually subject to Europeans, are more remarable for mildness, bashfulness, timidity, and indolence. In consequence of this last characteristic, they are generally in a state of indigence. They shave their beards, while the Kandians do not. Before undergoing that operation for the first time, a young man must give a sumptuous entertainment to his relations and neighbours. Those who cannot afford it retain their beards till their circumstances are improved. The men of influence, called Modelears, retain the insignia of greatness, but their power has been abridged by their European masters. One of them is now placed at the head of every department of government, under the control of the British agents. The dignity of a Mode-

[a] They are enumerated and figured by Dr. Davy, at p. 240, 241.

[b] See some representations of the temples and houses in the work of Dr. Davy, p. 257, 258, 259.

[c] See Dr. Davy's wood cuts, ibid. p. 273, 274.

lear is always conferred by the British governor in person, and is of great importance in the eyes of a Singalese. Those who enjoy good incomes do not indulge habitually in any luxurious style of living. A Modelear, when retired to his own dwelling, is found stripped to the skin, sitting in an armed chair, with no covering except a piece of muslin on his loins; but in giving entertainments he will expend large sums. They sometimes give a breakfast, or a ball and supper, to their European friends in a splendid style, on particular festive occasions, such as the birth of a child, or the obtaining of any honourable distinction. One of those erections common in the east, called Bungaloos, which are spacious open apartments, covered with roofs which serve for an agreeable and elegant awning, is sometimes made for the use of a single evening of pleasure and display, when it is embellished and lighted up in a most magnificent manner. The higher orders of the Singalese in the maritime part profess Christianity, and perform their marriage ceremonies according to the usages of the Dutch. This is generally done on Sunday, accompanied with music, dancing, and feasting, to which is sometimes added tumbling, performed by expert natives. When a Singalese pair marries, the thumbs of their right hands are tied together with a slip of cotton cloth, and water is poured on them by the man's father's brother, and the woman's mother's sister.

A part of the low country has, from time immemorial, been inhabited by Malabars. These wear large bunches of ear-rings, and encourage the artificial apertures in the flap of the ear to grow to an enormous size, so that a man's hand may pass through them; the lower parts being stretched till they reach the shoulder. A considerable number of Malabars are Mahometans, and go under the name of Moors or Lubbies. They follow the occupation of pedlars, tailors, fishermen, and sailors. These differ from the Singalese in concealing their women. When a Moorish woman is moved from one place to another, if a palanquin cannot be afforded, she is placed cross-legged on an ox, and covered completely with a white sheet, the husband walking by her side. A considerable number of free Malays reside at Ceylon, some of whom are persons of rank who have gone into exile on account of political troubles.—The maritime parts contain many Christians, both of the Romish and Protestant church. The Portuguese, when they settled on the island, destroyed every monument of the existing religion along the sea-coast, converted the temples into Romish churches, and compelled the natives to adopt the forms of their religion. Fifteen priests educated at Goa still exert themselves with daily success in making proselytes.[a] The Dutch, in their turn, disseminated their religion, not by positive persecution, but by enacting that no native could be raised to the rank of a modelear, or enjoy any employment under the government, without conforming to the creed and observances of the reformed church. Hence the higher orders assumed the name of Protestant Christians, which they still retain. Under the British rule some exertions have been made to convey to the natives farther instruction in the Protestant religion, particularly by disseminating translations of the Scriptures, as the standard of Christianity.

The history of Ceylon, previously to the visits paid to it by distant nations, is, like that of continental India, enveloped in uncertainty. We know that the island was frequented by the Arabians and Persians from very distant times, but these have not recorded any particulars which elucidate its history. The Singalese traditions are destitute of historical accuracy. Their first king they maintain to have had a lion for his father.[b] Rama makes a great figure in their legends, and probably was a real personage of illustrious eminence, by whose name a kingdom and city were known. They give a narrative of the different invasions of the island by the Malabars; of their battles with the natives; of their success at one time in subjugating the whole of the island, with the exception of Magam and Roona in the Magampattoo, and of their subsequent expulsion by king Wijeyabahoo.

The Portuguese discovered Ceylon in 1505. They formed a settlement about 1520, and became firmly established here in 1536. It was in their hands that the natives first saw fire arms employed. By taking a part in the dissentions of the royal families, they sometimes had possession of Kandy. The natives, after having long suffered oppression and insult, formed an alliance with the Dutch for the expulsion of the Portuguese. For this service they agreed that the Dutch should receive all the maritime provinces, except Batticaloe and Putlam. The Portuguese were expelled, and the Dutch established, in 1658. The Kandians had now a succession of kings who have left behind them different characters, some having reigned in wisdom and peace, others tyrannized with cruelty over a reluctant and a rebellious people. The religion of the country having been neglected, and in a great measure effaced by wars and intestine troubles, Rajah Singah (during whose reign the interesting traveller Knox was detained for many years a prisoner) sent to Siam, with the assistance of the Dutch, for priests in order to operate a reformation. The king, Rajadi Rajah Singha, who cooperated with the British in 1796, to expel the Dutch from the maritime provinces, had the character of a voluptuous and indolent man. By this foreign alliance he obtained no sea port, as he had expected, and the only alteration in his condition was, that he got a more powerful neighbour in the maritime provinces. The English afterwards attempted to take possession of Kandy, and were for some time in possession of the metropolis, when, in 1803, the English garrison was attacked, overpowered, and treacherously massacred. A desultory warfare was afterwards carried on for two years. Between the years 1805 and 1815, no active hostilities took place, but the court and kingdom of Kandy were now a scene of the most sanguinary proceedings on the part of the tyrannical sovereign, scarcely equalled in history for their atrocity, and giving rise to a desperate resistance on the part of his subjects. The king evinced a jealousy towards his minister Pilimè Talawè, and inflicted on him some indignities. A rebellion was in consequence raised, and followed by the

[a] Cordiner.

[b] Dr. Davy's Account, p. 293.

beheading and impaling of some chiefs, and the execution of the minister in 1812. His successor in office fell under the displeasure of his master in his turn, and was obliged to fly. An execution of seventy respectable persons followed. The wife, children, and near relations of the minister were executed. The mother, after being forced publicly to bray the head of her sons, one after another, in a mortar, immediately after they were separated from the body, was then, along with her sister-in-law, drowned in the adjacent tank. No person was safe. The most innocent, and even the highest of the sacerdotal order, who were supposed almost inaccessible to just punishment for crimes, were sacrificed to the whimsical suspicions of this barbarian. Some native merchants belonging to the British provinces having gone into the Kandian kingdom, were sent back cruelly mutilated. The governor, Lieut. General Brownrigg, declared war, prosecuted the contest with vigour, and the king was secured in a house to which he had gone to take shelter, in January, 1815, was sent to Columbo, and from thence to Vellore, where he is retained in confinement. His name is Sree Wikrimé Rajah Singha. The country submitted to the British power, under the condition of the old laws and administration of the kingdom being maintained. Only 1000 men were kept in the interior, and confined to a few military posts. A dissatisfaction, however, with their new masters, soon sprung up. The chiefs conceived that they were treated with no respect, except on official occasions, the English soldiers having, from ignorance, continually offended them by neglect. The English were somewhat disrespectful in their mode of entering the temples and of addressing the priests. A rebellion broke out under a native pretender to the Kandian throne, in October, 1817. The war was carried on by the operation of small bodies, and was irregular and severe, and the retaliations made by the English military were often exceedingly inhuman, as in such a situation it was not practicable to maintain a strict obedience to general orders. In a few months the revolt was suppressed. Kandy was taken, and with it the sacred tooth of Buddha, a relic, the possessor of which is considered by the people as rightful sovereign of their country. Simpler and less oppressive arrangements were now formed for conducting the government and apportioning the revenue, which are likely to prove more conducive to the happiness and the satisfaction of the natives. It is an island which, throughout the interior as well as along the sea-shore, possesses admirable natural advantages, and, under an enlightened and generous management, might be rendered one of the most flourishing spots in the world.

We shall now take a rapid view of some of its chief localities, particularly the towns, beginning with those along the sea-coast which have been longest known. At the northern extremity of the island are the fort and town of Jaffnapatam, in 9° 47′ of N. lat. and 80° 9′ of E. long. The fort is the most modern, the best constructed, and handsomest in Ceylon. It is situated on a piece of land called Jaffna, which is sometimes denominated an island, sometimes a peninsula. It seems to be connected with the main island by a fordable strait, which is perhaps a dry isthmus at low water. Within the fort is a Dutch church, containing a tolerable organ, and one of the most respectable places of Christian worship now in the island. There are also a house for the commandant, buildings for the public offices, and houses belonging to the Dutch proprietors, which are rented to the British officers; a street of barracks, and one occupied by the mechanics and the lower orders of the people. The pettah, or outer town, half a mile from the fort, contains several thousand inhabitants, mostly Europeans; its streets are regularly built and kept clean, and the chief street finely shaded by rows of large trees on each side. Almost all the Dutch families which formerly resided at Tricomalee have removed to this place, which is recommended by cheapness and agreeableness. The country is fruitful; an air of business prevails, and some regular trade is kept up with the opposite coast of India. Mr. Cordiner remarked, that this country yielded vegetable produce in great variety; but that the culture of the common English potato had not succeeded either here or in any other part of Ceylon. The surface is flat, but rich in every spot, and in high cultivation as far as Point Pedro, the northern extremity, at a distance of twenty-two miles from the town. Here the supreme court of judicature is frequently held, and the governor of the island sometimes comes from Columbo to preside.[a] Many thefts and murders occur in the province. A common form of robbery is to cut open the flaps of men's ears during sleep, and carry off their ear-rings. Yet the people habitually sleep in their houses without locking their doors, or in the open air in their verandas. The native inhabitants are Malabars, one half of whom are of the Brahminical religion, the other consists of Christians, with a very few Mahometans. Agriculture being in a flourishing state, and a small military force being sufficient to keep possession, this is the only province of Ceylon the revenue of which exceeds its expenses. Tobacco is cultivated in large quantities, and is a standing article of commerce, and a fruitful source of revenue. The timber of the palmyra tree, which is used for rafters in the building of houses, and chanque shells, which are much used as ornaments in dress among the Hindoos, are the other principal articles of commerce. In this province are to be seen the remains of thirty-two Portuguese churches, and there are a few chapels in which the Romish worship is still celebrated. In the neighbourhood of the town there are some humble Hindoo temples of recent construction, built since universal toleration in religion has been re-established.

Proceeding round the western coast we traverse a country which is completely laid under water in the rainy season, though not to such a depth as to prevent travelling. Here we have on the right two small islands, called "the Two Brothers," then another large one called Manaar, containing a fort. A little farther south is Aripo, the place where the governor fixes his head quarters during the pearl fishery. Here and at Condatchy the country is bare, and at other times almost deserted.

Proceeding farther south, we come to the long penin-

[a] Cordiner's Description, vol. I. p. 327.

sula of Calpenteen, lying parallel to the line of the coast for about sixty miles, and connected with it by an isthmus at its south end. It has a fort, (without guns,) an excellent wharf, and a small village adjoining, containing a Portuguese priest. The inhabitants are pretty numerous, and export salted fish to Columbo, for which they bring back rice. The peninsula is low, and flat, sandy, and covered with cocoa-nut trees. The coast of Ceylon, at this place, is at all seasons beautiful and verdant, and possesses much natural fertility. Elephants and other wild animals, birds of beautiful plumage, and a great variety of insects, are seen here. Putlam, lying opposite to the peninsula, is one of the largest and most commercial native villages in Ceylon. Here the areca nuts, cardamoms, black pepper, and coffee of the Kandian provinces, are exchanged for the manufactures of Coromandel, chiefly by Mahometan merchants. Oysters are gathered along the shore at all times in great numbers, and the sands contain many beautiful shells. The country is periodically inundated by the sea to a distance of several miles from the shore, and considerable quantities of salt are crystallized by the heat of the sun, and collected by the natives.

About a day's journey south from this is Chilaw, a comfortable village, lying between two branches of a large river. A pearl fishery is occasionally carried on here. At this part of our progress along the coast, the inhabitants begin to consist of Singalese instead of Malabars. Here the mountains of Kandy come in sight. No mountains are seen between Jaffnapatam and Chilaw. Negumbo is a beautiful village, which we enter by passing through a cocoa-nut grove with a shaded avenue. It contains a pentagonal fort. Several Dutch families live in it, apparently happy, but reduced in their circumstances by the political vicissitudes of the country. At this place the cinnamon plantations commence, extending, with few interruptions, a great way beyond Columbo. The country is well cultivated, and the people wear an air of comfort. The finest fruits are reared, and sell at very low prices. From this to Columbo the country is luxuriant, well cultivated, and the road lined with excellent houses, indicating the approach of the traveller to the capital of the present government.

Columbo lies in 7° of N. latitude. The fort is composed of seven bastions with intervening curtains. It measures a mile and a quarter in circumference, and is almost entirely surrounded with water, being situated on a projecting piece of land belonging to a stripe which lies between the sea and a large fresh water lake. Two thirds are encompassed by the sea, the other is bounded by the lake ; two narrow necks of land, like causeways, connect it with the main land on two sides. None but small vessels can lie close to the wharf, and there is no good harbour where vessels can at all times ride in safety. The interior of the fort is beautiful, the streets regular and shaded with trees. The houses in general have only one story, and verandas in front. The water within the fort is brackish. That which is used is brought from a distance of a mile and a half. Rich and beautiful views are obtained from an excellent walk surrounding the ramparts of the fort. The pettah is situated a few hundred yards to the east of the fort, on the same piece of doubly peninsulated land. It is larger than the town within the fort. The streets are regular and clean. It contains an orphan asylum for the children of Europeans. The boys educated in it perform the business of clerks in the various offices of government. It is bounded on the north by the sea, on the south by the lake, on the west by the esplanade of the fort. On the east, where it is connected with the main land, it was formerly defended by a fortified wall. Beyond this, many straggling streets extend for several miles into the country. The fort is chiefly inhabited by English, the pettah by Dutch and Portuguese, and the suburbs, which are the most populous of all, by native Singalese. Columbo contains in all upwards of 50,000 inhabitants. The houses of the Singalese, here, and indeed over all the island, are much more comfortable than the huts of the Hindoos on the continent, especially about Madras. Bathing in fresh water is a daily practice among the native inhabitants of Columbo, who frequent the lakes and canals in large companies. Men, women, and children, are intermixed, but without stripping themselves naked. They stand immersed nearly up to the shoulders, and from a pitcher pour water over their heads continually for half an hour or longer. A dread of sharks prevents them from bathing in the sea.—The neighbourhood of Columbo contains a great variety of hill and dale, and furnishes a number of delightful rides, scarcely equalled any where else within so small a compass. The face of the country is chiefly covered with trees. Much constant attention is required to keep any spot in the state of a cultivated open field. Even when a road is formed, shrubs spring up upon it so rapidly, that if it be neglected for two months, the traces of it can hardly be discovered. Several pleasant rides, from three to eight miles in extent, are formed, leading from one gate of the fort, traversing the intermediate country, and returning by the other gate ; along these many pleasing villas have been erected, and sometimes light and elegant bungaloes of wooden pillars, roofed with cocoa-nut leaves. The borders of the lake are finely diversified, and it affords an opportunity for taking pleasant aquatic excursions. It contains a large peninsula, of fertile soil and varied surface, originally connected with the shore at the side opposite the fort, and also joined to the fort itself by an artificial causeway. This piece of land, with its indented borders, thus divides the lake into two. It was formerly occupied by slaves in the service of the Dutch government. The construction of the fishing boats used here, and on the Calany-ganga river, is curious. Each consists of a canoe made of one tree scooped out, about fifteen feet long, which is too light to allow a person to step into it without oversetting, were it not for a small parallel log of wood, with pointed ends, floating alongside at a little distance, and connected with the canoe by two sets of elastic poles. This is called an outrigger. To this the ropes of the sail extend, by which it is lowered in an instant. Strabo, Pliny, and Solinus, describe a similar boat as used in their time in the same seas. Columbo enjoys one of the most salubrious climates in the world. Those who remain within doors during the heat of the day find it agreeably temperate. Out of a thousand British soldiers, it often happens that not one is lost in two months. The thermometer fluctuates about 80° of Fahrenheit's scale,

being seldom more than seven degrees under or above it. The insulated situation of the place, its partaking of the salutary influence of both monsoons, the frequency of refreshing showers, the land and sea breezes, and the bibulous soil preventing the stagnation of water, are circumstances which all contribute to this happy effect.

In 1802 a supreme court of judicature was established at Columbo, consisting of a chief justice, and one puisne justice, and annexed to it was the advocate fiscal, the registrar, a sheriff or fiscal, and a competent number of clerks and other officers. Two Dutch gentlemen who had learned the English language were, in Mr. Cordiner's time, (1805,) the only persons who acted as advocates and proctors. There are three subordinate courts for settling less important causes, civil and criminal. The number of causes which come before them is great, the people being extremely litigious, and fond of having their complaints heard and investigated. Persons in the small circle of genteel English society at Columbo, find it extremely agreeable, and prefer it to that of the other English stations in India; but the habits of that nation, making conviviality a necessary ingredient in all easy social intercourse, operate as a cause of separation from the Dutch and other Europeans, except on public occasions of infrequent occurrence, when, however, they show sufficient cordiality. Much advantage would accrue to the English nation, and those with whom they come in contact, if they could more readily surmount this awkwardness, and resign their slavish attachment to particular modes of intercourse, which are often too expensive to admit of a due extension of the bonds of society. The institution of literary and scientific associations, such as the Asiatic and other literary societies in Calcutta, have had a happy effect in bringing together individuals who, though mutually allied by a community of taste and pursuit, would otherwise have been unknown to one another. It is certainly agreeable, for example, to find the Danish Missionaries and other oriental literati becoming associated with the well informed English at Calcutta. Ceylon affords an ample field for philosophical investigation, as well as the formation of economical active institutions, which might afford agreeable employment for persons associated in liberal pursuits, and some such might undoubtedly be found among the Dutch and other inhabitants of that island. The spirit might at least be cherished. The cultivation of elegant and cheap pleasures of this kind would give a happiness and a dignity to the society of the country, which mere extemporaneous agreeableness, however desirable in its own place, never can impart.

Proceeding southward from Columbo, we pass Caltura, a village pleasantly situated on the banks of a river, with a small fortification, and inhabited by Singalese, and some descendants of the Portuguese;—also Barbareen, a place famed for its oysters;—and we afterwards arrive at a more important place, Point de Galle,[a] at a distance of seventy-eight miles from Columbo. The road lies along a low sandy shore, luxuriant in cocoa-nut trees. At Point de Galle there is a large fort, within which almost all the Europeans live. There are very few large houses built without it. There is a manufacture of ropes from the fibrous rind of the cocoa-nut; these are called coiar ropes. A considerable trade is carried on in small craft. The fort is on a rocky promontory. Its works are extensive, but it is commanded by other eminences. The harbour is tolerable, and ranks the second in the island, being commodious and secure, though small, and somewhat difficult of entrance. It is commanded by the fort. From this place the productions of the island were shipped for Europe by the Dutch, and part of them still is. The disease called elephantiasis, because the legs of the patient swell so as to resemble those of the elephant, prevails here among the natives. It has not been known to attack any Europeans, except such as were in extreme poverty.

Beyond this is the fertile province of Matura, filled with beautiful scenes resembling the parks of European gentlemen. Near Belligam, in this province, is a Singalese temple of Buddha, called Agra-boddha-ganni, with some idols and hieroglyphical paintings representing the history of their kings. The statues of Vishnu and Siva are conjoined with that of Buddha. The architecture is peculiar but elegant, and near it is a tomb of Buddha, resembling a bell of the most tasteful form.[b] Near this temple is a large statue sculptured out of the solid rock, and known by the name of Crusta Raja, and supposed to represent an Indian prince who subdued this part of the island. Belligam is a populous fishing village. The right of fishing is let by the government to men of property. This is the case along the whole coast of the island. Hence fish are expensive, and the fishermen are not allowed to supply vessels as they pass, lest they should misrepresent to the renter the quantity of fish which they have caught, of which he is entitled to one third. Each of the villages along this coast contains a Christian school. Farther on is the little town of Matura, on the Neel-ganga river, to which a small fort is attached. It contains several comfortable houses belonging to families of Dutch extraction.

Three miles to the east is Dondra-head, the southernmost point of the island, which seemed to Mr. Cordiner to be a low stripe of land covered with cocoa-trees, but a mile to the east there is a higher and more rugged promontory. Just at the extremity of Dondra are to be seen the remains of a Hindoo temple, probably once the most magnificent structure in the island. They consist chiefly of a long avenue of 200 stone pillars, the stone frame of a door carved with stern looking heads and borders of foliage, and the shattered relics of several images. Close to this is a temple of Buddha. There is also a mud-built sanctuary dedicated to Vishnu, divided into several apartments, hung round with calico, on which are printed figures of some sanguinary deities. It contains a stone image of Ganesa, having the head of an elephant on the body of a man. Here the Singalese come to be sworn when about to give legal evidence. A few miles inland from Dondra-head is the stupendous mountain of stone called by the Singalese Mulgeerelenna, and by the Dutch Adam's Brecht, being one entire rock of a cubical form, 300 feet high. A winding flight of 545 steps lead to the summit, said to have been formed 1500 years ago. On the summit is a bell-shaped

[a] Punta de Gale.

[b] A plate of it is given by the Rev. Mr. Cordiner in vol. I. p. 188, of his Description.

tomb of Buddha, similar to that which accompanies all his temples in the island. From this situation the view is rich and magnificent. A little way from the top there is a remarkable natural cave, and two artificial caverns, forming gloomy temples of Buddha, containing many statues and hieroglyphical paintings. At the foot of the rock are the houses of ten priests. The province of Matura is very populous; it contains many temples, and about 2000 priests. It is well cultivated, and yields a considerable revenue, but unhealthy, and very liable to epidemic fevers. Agriculture is now likely to flourish in it; as it is relieved from the discouragement which its Dutch masters threw in its way for the sake of creating an exclusive market for the rice of Batavia.

After we have passed to the east of Dondra-head, and begun to take a northerly direction, by travelling along the coast, we come to Tengalle, an old Dutch fortress in a district allotted to the hunting of elephants. Here a great many of these animals are caught. The village contains 300 inhabitants, chiefly fishermen.

Between Tengalle and Batticaloe, the country is inhospitable from its neglected state, and the multitudes of ferocious animals which it contains; so that the traveller often prefers a coasting voyage to a land journey over this interval. The wildest part, though of great natural fertility, is called Mahagampattoe, on the shores of which are the salt bays of Magam, by which the Kandians were always supplied with salt while at war with the masters of the maritime districts. It never was in the power of the latter to prevent them from supplying themselves at this place. The sugar cane and maize grow here with uncommon luxuriance, but cultivation cannot be carried on for want of protection from the depredations of wild beasts. Agriculture in this quarter would also stand in need of tanks to afford a due supply of water, as the climate is much more liable to protracted droughts than on the western shore. Some tanks had been formerly maintained here, but in Mr. Cordiner's time they had, through the selfishness of some individuals, and the supineness of others, gone to decay. There are several marks of former cultivation, some small villages at great mutual distances, and some traces of old religious monuments.

Batticaloe, on the east side of the island, lies much more to the north than Columbo on the west, being nearly in the latitude of Chilaw. The fort is on an island of the same name, three miles and a half in circumference, contained in an inlet of the sea. There is a small village, all the inhabitants of which speak the Malabaric language, and chiefly consist of Hindoos and Mahometans, some Romish Portuguese, and a very few Protestants. There are several islands adjacent. The country is flat, but the ground gradually rises towards the interior, till it terminates in high mountains, among which is a rocky eminence of a cubical form, on the top of which is a place belonging to the king of Kandy. Batticaloe is garrisoned by sixty sepoys, and fifteen gun Lascars. The surrounding country is one of the cheapest and most fertile in the island. Fish are in great plenty. The native inhabitants are described as extremely civil and obliging.[a] They have a contented and happy appearance. The scenery is adorned with the magnificent talipot tree, the largest of the palms Mr. Cordiner saw one which measured 100 feet high, and six in circumference.

Nearly a degree north from Batticaloe, is Trincomalee, the most important station on the coast of Ceylon, from the noble and commanding harbour which it possesses, capable of affording ample protection to an extended commerce. It is situated in N. lat. 8° 28′. From its position, and the ready entrance and egress which it affords at all seasons, it is better adapted for a marine depôt than any other station in India; yet it has been unaccountably neglected by the English, since they obtained possession of the island. The soil here is rather dry, and the climate unhealthy, and in these particulars the Dutch did not improve it; they wished to obviate the cupidity of rival nations, by discouraging the visits of strangers. The territory might, however, be cultivated with success. As it is, it presents, in point of verdure, a marked contrast to the sandy and flat shore of Madras, with its rugged cliffs, its woods, its plains, and its villages. It contains a copious variety of romantic and sublime prospects. The fortifications are principally of Portuguese workmanship; a little was added to them by the French, but scarcely any thing by the Dutch. While it is the most likely place for an enemy to attack on account of its value, it is at the same time capable of being made stronger than any other in Ceylon. Every convenience is afforded except that of wet-docks, for which there is not a sufficient rise of the tide. While Mr. Cordiner was there, it had a neglected aspect, and the houses in the fort were in great disrepair. At one time the English garrison had suffered from a neglect to provide fresh animal food, being subsisted five days in the week on salt provisions. Six miles to the north-west are the hot wells of Cannia, which have a temperature of 106⅔, and are regarded with religious veneration by the Hindoo natives, who have built a temple at the place.

The road leading west from Trincomalee towards Jaffnapatam, part of which is well adapted for carriages, is in many places rich in romantic prospects; and rest-houses for the accommodation of travellers are built in different parts. The inhabitants of the country have the appearance of innocence and happiness. Cocoa-nut trees are rare on this side of the island compared to the other. A few oxen and buffaloes are kept. Wild elephants inhabit the woods, and alligators the rivers and their banks. Moletive, on the sea shore, is a neat comfortable village, with some spacious houses. A garrison is kept in it, but it seems to have been made a military post for keeping open the communication between Trincomalee and Jaffnapatam. Ancient redoubts are found in different parts, but scarcely any other monument of human labour, though the district was once highly cultivated. The places dedicated to religious uses were razed by the Portuguese, and private houses have always been formed of too perishing materials to leave any permanent traces of their former existence.

A few prominent objects in the interior of Ceylon, the late kingdom of Kandy, remain to be noticed. In the first place, the capital city, Kandy, in a district called Yattineura, is at the head of an extensive valley, and about 1400 feet above the level of the sea, on the

[a] Cordiner, vol. I. p. 261, 262.

borders of an artificial lake made by the late king, surrounded by wooded hills and mountains, varying from 200 to 2000 feet in height. Its situation is beautiful and romantic, but in a military view insecure, and hardly admits of defence. The houses are all of clay, of one story, and all thatched, except those of the chiefs, which are tiled. There is one street which used to be exclusively inhabited by Malabars, relatives and dependants of the king, in whom he could place more confidence than in his own subjects. The palace occupied a considerable area. Its front, about 200 yards long, has rather an imposing appearance; it rises above a handsome mole, and looks towards the principal temples. It is terminated at one extremity by a hexagonal two-storied building, in which the king presented himself on great occasions to the people collected below; at the other it is terminated by the women's apartments, on which the sun, moon, and stars, as insignia of royalty, were carved in stone. Here the king and his ladies stationed themselves to witness the processions at the public festivals. This city abounds in temples, which seem to have been considered as a necessary appendage to a royal palace. Every royal residence in the island had a number of them, some of which have survived the palaces to which they were attached. The Dalada Malegawa, the domestic temple of the king, is the most highly venerated of any in the country, as it contains the precious relic, THE TOOTH OF BUDDHA, to which the whole island was dedicated. It has two stories, and is in the Chinese style of architecture, but small. The sanctum is an inner room in the upper story, about twelve feet square, without a window, and never visited by the light of the sun. It is a place of the most striking splendour. The doors have polished brass pannels, and a curtain before and behind them. The roof and walls are lined with gold brocade, and scarcely any thing is to be seen but gold, gems, and sweet smelling flowers. On a low stage, occupying half the room, there is a profusion of flowers tastefully arranged before two or three small figures of Buddha, one of crystal, and one of gilt silver, and four or five caskets called karanduas, containing relics. All the karanduas except one are small, not more than a foot high, and wrapped up in numerous folds of muslin. One is much larger, uncovered, and decorated with the utmost brilliancy. It is five feet four inches high, and nine feet ten in circumference at the base. It is of silver gilt on the outside, of neat but plain workmanship, and studded with a few gems. Rich ornaments are attached to it, consisting of gold chains, and a great variety of gems suspended. Here among the rest, is a bird formed entirely of diamonds, rubies, blue sapphires, emeralds, and cat's-eyes set in gold, the metal being hid by the profusion of stones. This great karandua is the receptacle of the "Dalada," which is considered as the tooth of Buddha. It is inclosed, first in a small karandua, which is within a larger, and there are four of these, one within another, besides the great karandua.

Two institutions, called the Malwatté Wiharé, and the Asgirie Wiharé, both without the town, are at the head of the ecclesiastical establishment of the country They are a sort of monasteries, or colleges, the one containing about forty priests. The sacred buildings are rendered ornamental by the groves of cocoa-nut trees, and the venerable banyans around them, which are carefully preserved. The appearance of Kandy altogether has declined since it fell into the hands of the English. They do nothing towards the repairing of the temples; they have pulled down much and have built but little.[a]

The high mountain called Adam's Peak, is one of the chief curiosities of the island. The approach to it, for a considerable way off, is rugged and difficult. The peak is of a conical form, rising rapidly and majestically to a point. The ascent near to the top is precipitous, and lives are sometimes lost in climbing it, although iron chains are fixed in the rocks, to aid the numerous pilgrims who visit it. Those who have been on the summit describe the beauty and grandeur of the prospect enjoyed from it in the highest terms.[b] The area here is very narrow, and walled in to prevent accidents. Here Buddha is supposed, when he landed on his first visit to the island, to have left the mark of his foot. A superficial hollow, five feet long, is venerated by the natives as the sacred impression. It is ornamented with a margin of brass studded with a few ordinary gems, and covered with a roof which is supported by four wooden pillars fixed to the rock by four iron chains. The roof is lined with coloured cloths, and its margin decked with flowers and streamers. Lower down in the same rock, there is a little niche of masonry dedicated to Samen, the guardian god or saint protector of the mountain, with a small house of one room for the officiating priest. This peak is visited by numerous pilgrims, who, assisted by a priest, perform devotions according to a ritual. It is the custom, at the conclusion of the ceremony, for relations, young and old, to salute one another, and the usage is accompanied with symptoms of the liveliest affectionate feeling. Each pilgrim makes a small offering; these are placed on the sacred impression, and removed by a servant. They are the perquisites of the chief priest of the Malwatté Wiharé. The height of the peak is about 7000 feet above the surface of the sea. The temperature, when Dr. Davy visited it, fluctuated between 51° and 59°, being sufficiently low to give a chilly feeling to persons used to the high temperature of the plains. The name of "Adam's Peak," was given to the mountain by the Mahometans of Ceylon. The Singalese call it Sree-pada, which is also the name of the impression which gives it sanctity; sometimes Samenella, from the name of its guardian angel.

The whole of the interior of Ceylon is interesting from its natural fertility, and the beautiful and romantic views which it often displays. Much of it, however, consists of impenetrable and gloomy forests. Clumps of fragrant lemon grass diffuse in most places a delicious odour. The climate, being diversified by elevation and exposure, yet every where fine, contributes with the fertility of the soil to impress us with the high capabilities which might here be brought into operation under enlightened management,[c] but the country does not pre-

[a] Dr. Davy's Account of the interior of Ceylon, p. 364—371.
[b] Ibid. p. 342.
[c] Mr. Cordiner states, vol. I. p. 326, that the attempts to rear potatoes at Jaffna, or any other part of Ceylon, had not been successful. But Dr. Davy, however, p. 437, tells us, that this valuable root succeeded at Maturatta, a post about 2700 feet above the level of the sea.

sent many objects either natural or artificial, which would appear interesting in topographical detail. We may notice, however, two large lakes or tanks in the interior, on the north-east side of the mountains, in the direction of Trincomalee. The one is the lake of Minerè, fifteen or twenty miles in circumference, the waters of which are confined by an embankment about a quarter of a mile long. The outlet is formed by very large masses of rock. This was probably a source of great and extensive fertility at a former period, when its waters were directed by man; but these are now allowed to run waste, forming swamps, and supporting a rank vegetation, which contributes to the unwholesomeness of that part of the country.—Twenty-nine miles north-east from this is the lake of Kandellè, which has embankments of greater magnitude than that of Minerè; one is about a mile and a half long, and twenty feet high, besides which there is another of smaller size. The outlets, or sluices, are of vast strength, and constructed with great art; but the lake itself is of much smaller extent than that of Minerè, being only three or four miles in circumference.

The Laccadive islands, lying seventy-five miles to the west of Malabar, are thirty-two in number, besides rocks and dry spots too small to be inhabited. They extend from the 10th to the 12th degree of N. latitude. They are separated by wide channels. The largest of them does not contain six square miles of land. They are surrounded by coral rocks and shoals, which render the approach dangerous. They yield no grain, their only produce being cocoa-nuts, betel-nuts, and plantains. The inhabitants, who are poor, subsist on cocoa-nuts and fish; they are of Malabaric extraction, and profess the Mahometan religion. They export coir (the fibrous husk of the cocoa-nut) either in the raw state or manufactured into ropes. The best coir cables in the west of the peninsula are made at Anjengo and Cochin, from the fibres of the Laccadive cocoa-nuts. Some coral is carried from the surrounding reefs to the continent of India, where it is carved into images, and burned for quicklime. These islands were discovered by Vasco de Gama, but they have not been properly explored. They are politically dependent on Canara, and under the dominion of the English.

To the south of the Laccadives, and extending between the eighth degree of north latitude and the equator, are the Maldives, consisting of numerous islands and islets, grouped into twelve clusters called Atollons, some of which are round, others oval; a rampart of rocks surrounding each cluster serves to defend it from the sea, which rages here with great fury. The large islands are inhabited and cultivated, but a great number are mere rocks and shoals, many of which are flooded at spring tides. They have never been completely explored. Between the different attollons a considerable trade is carried on, as the different branches of manufacturing industry are confined to distinct groupes of islands, some being inhabited by weavers, others by goldsmiths, locksmiths, potters, mat-makers, joiners, or other mechanics, all of which are separate. The traders going from island to island are sometimes a year from home. Here, as in the Laccadives, the cocoa-nut tree is the chief vegetable production; yet the trees are in greater variety than those of the Laccadives; they have, among others, the wood called *candu*, which is compared to cork for its lightness. Ambergris and coral are collected in great abundance on the shores. An important fishery of cowries is carried on. Cattle are rare in these islands. Dogs are banished from them. Poultry is in great abundance. Dreadful depredations are committed both by the rats and the ants. The Maldivians are well made; their complexions are olive; they seem to be of Hindoo origin, with a mixture of Arabian blood,[a] as their beards are bushy and their bodies hairy. Some of their women are as fair as Europeans. They have a peculiar language. They profess the Mahometan religion, but retain some traces of an older creed. They are, for instance, in the practice of sacrificing annually to the god of the winds, by launching on the sea barks crowned with garlands, and filled with amber and fragrant wood, which they have set on fire. They dress in light silk and cotton stuffs. The more learned among them speak Arabic, expound the Koran, and possess some ideas in astronomy and medicine. Peyrard, who suffered shipwreck here in 1602, describes the natives as an ingenious, brave, and industrious race, but of warm temperaments and dissolute morals. By some Europeans who have visited them, they are praised for their inoffensiveness and hospitality. In 1777, a French vessel, with some ladies of rank, was wrecked on the island of Imetay, and all the sufferers met with the kindest treatment from the chief and his subjects. In 1812, Lord Minto, governor-general of British India, received from the sultan of the Maldives a letter, stating that the vessel Europa, under British colours, had been cast away on the uninhabited island of Andue, and that the crew and passengers, amounting to fifty-three in number, were treated in the most hospitable manner, although the conduct of several of them was insolent and outrageous in the extreme. The complaint received due attention, reparation was made for the injuries inflicted, and the whole transaction served to place the character of these people in a most favourable light. We are little acquainted with their internal government, but it does not appear that the groups of islands ever engage in mutual warfare. The houses of the inhabitants in general are of cocoa wood and leaves. Some of the richer traders have stone houses. The sultan's palace is a low stone building, regularly fortified. The sultan has long been accustomed to send an annual embassy to Ceylon, which has been continued since that island came under the dominion of the English.

At one time a vessel or two from the British settlements used to visit the Maldives to load cowries, but owing to the unhealthiness of the climate, and the long detention found necessary, these visits were discontinued, and the trade is now carried on by Maldivian vessels, which arrive at Balasore in Orissa in the months of June and July, loaded with the various produce of the cocoa tree, and with marine products, such as cowries, turtle shell, and salted fish. They leave it in December, carrying home sugar, and some other manufactures, but chiefly rice. Ships from eastern India sometimes resort to the Maldives to procure shark fins for the Chinese, among whom they are valued as an excellent seasoning for soup.

[b] Asiat. Annual Register, 1802, Characters, p. 17, 18.

BOOK L.

INDOSTAN CONTINUED.

PART IV.

A Historical and Moral View of India.

THE extensive countries now described have, both from physical and historical data, been supposed to be the earliest seat of a regularly organized civil society. The warm climate and abundant productions of India must have afforded every facility to its inhabitants for uniting in the social state. When we consult the historic page, we find that an intercourse between it and western Asia existed from the most remote ages. The books of Moses make mention of the aloes-wood, the ebony, the cinnamon, and the precious stones of India, though the country was not then known by name. At a later period we find the Phenicians, the Egyptians, the Greeks, and the Romans, repairing to the coast of Malabar for the light stuffs, the indigo and other colouring drugs, the gum-lac, the articles of ivory and mother-of-pearl, which that country still exports.[a] Consequently a certain degree of civilization must have existed among several Indian nations, and they must have lived in political society some ages before they were brought into a state of regular communication with the rest of the world by the invasion of Alexander. We find the religious and political systems of India, at the era of Alexander and the Ptolemies, the same with those of modern Indostan. The division into castes, separated from one another by rigorous laws, formed, at that period, an essential and fundamental institution. Arrian and Strabo enumerate seven castes, while we only acknowledge four leading divisions of this kind; but it is well known that the subdivisions are numerous, and that there are anomalous groups of persons which might be reckoned separate castes. Such are the shepherds, or nomadic and predatory tribes, and also the political functionaries of the state.[b] The Macedonians found the same varieties of fantastic devotees, called fakeers, who have been viewed with so much astonishment by our modern travellers. Some lived in forests, feeding on roots, and using the bark of trees for their only clothing; others sold amulets and miraculous remedies to the credulous, exhibited dancing serpents, or told fortunes; others lay whole days on the ground, exposing themselves to torrents of drenching rain with consummate patience; while others sat naked on stones heated almost to redness, and braved at the same instant the rays of an ardent sun and the stings of numerous insects.[c] All of them wore an immense quantity of hair on the head, which was encouraged to grow to its utmost, but never cut nor cleaned.[d] Strabo rejected as fabulous the accounts which he received of their practice of bending the fingers backward and the toes of the feet forward, so as to walk on the upper part of the foot;[e] yet these are exercises to which the fakeers are daily addicted.

In those ancient times there were also courtezans attached to the temples,[f] and placed under an inspector, who called them together at the sound of a bell.[g] The self-immolation of widows on the funeral piles of their husbands;[h] the use of ivory rings on the arms, of parasols, and of white leather slippers,[i] characterized the Indians before the Christian era. The abuses which had crept into their religious system; the extravagant superstitions with which it was loaded; and the grossness of the allegorical emblems employed to represent the Divinity, are considered by some, though rather theoretically, as decisive proofs of a highly remote origin.[k]

But we must not, on this point, give way to the exaggerations of some persons, who have been actuated by party spirit. There is no monument possessing the slightest pretensions to authenticity that leads us farther back than the epoch of Moses. Some of the astronomical tables of India claim a higher antiquity; but these have been shown by an illustrious mathematician to be drawn up from a retrograde calculation;[l] and the Surya-Siddhanta, their oldest book of astronomy, which they pretend to have been given them by revelation two millions of years ago, must have been composed within these 800 years.[m n]

The *Maha-Bharat*, or universal history, the Ramayana, and the Puranas, are mere legends and poems,

[a] See our History of Geography, Books VIII. and XI.

[b] The caste of shepherds, which lived insulated, and in a savage state, corresponded to the numerous tribes of nomades, robbers, and pirates, which, at the present time, are nearly strangers to the Brahminical civilization. The castes of inspectors and counsellors of state were only political functionaries."—M. B.—P.

[c] Onesicritus, Megasthenes, and Clitarchus, quoted by Strabo, Geogr. lib. xv.

[d] Dionys. Perieg. v. 1012.

[e] Strabo, II. XV.

[f] "Bayadères."

[g] Aristobulus, quoted by Strabo.

[h] Strabo, XV. Cicero, Quæst. Tuscul. V. 27.

[i] Arrian, Ind. c. 30. p. 330. edit. Gronovii.

[k] "The religious and political institutions of modern Indostan appear to have existed, essentially, at least a thousand years before the Christian era. They had even then given birth to numerous abuses, and extravagant superstitions; but even in the grossness of the allegorical emblems, by which they designated the attributes of their divinities, the religion of the Hindoos furnished incontestible proofs of a very remote origin."—M. B.—P.

[l] Laplace, Système du Monde, p. 330.

[m] "About 750 years."

[n] Bentley, in the Asiat. Researches, vol. VI. p. 537. and IX. p. 195.

from which no plausible chronology can be obtained, and none of any kind prior to Alexander.[a] The European literati who have assigned to these treatises a higher antiquity, still acknowledge that they have suffered numerous interpolations.[b] The Vedas, the oldest of all the sacred books of the Indians, if we may draw a conclusion from the calendar annexed to them, and the position of the colure of the solstices which that calendar indicates, may be 3200 years old, that is, nearly as ancient as Moses.[c]

Adopting these moderate opinions on the antiquity of Indian civilization, we still find enough left to excite our admiration. The Hindoo nation, united for about 3000 years under the same religious creed, the same laws and institutions, presents a phenomenon so much the more rare and interesting as their country has been invaded by many foreign hordes, attracted by the fertility of the soil, and the unwarlike character of the aboriginal people.

The population of Indostan, amounting, at the lowest calculation, to 134,000,000,[d] is composed of two distinct classes; descendants of the ancient inhabitants, and tribes of foreign extraction. The real Indians call the latter *Milytch*, a term equivalent to barbarian among the Greeks and Romans.[e] The number of these tribes amounts to more than thirty, if we include among them the nomades who occupy the mountains and the deserts. The most conspicuous are the Tartars and Mongols,[f] the Afghâns or Patans, of whom the Rohillas form a branch, the Belooches,[g] who seem to have come anciently from Arabia, the Malays, the Persians, particularly the Guebres or Parsees, the Arabs, the black and white Jews on the coast of Malabar, and the black Portuguese, a mixed breed of Europeans and Hindoos who are widely spread over the coasts of the Deccan and the province of Bengal. These foreign races have come under our view in the course of our topographical details. Their manners and laws are greatly diversified. Their total number has been rated at ten millions.

The indigenous inhabitants are the Hindoos, or descendants of the ancient Indians. They formerly were the exclusive possessors of India, and still occupy the finest and most extended tracts of the country. Some of them have mingled with foreign blood, and adopted foreign religions and manners, in whole or in part. In this list we may include the Buddhists of the north-east of Bengal, and the kingdom of Assam, and the Singalese. The Seiks are distinguished from the rest by a new creed, and certain institutions to which it has given birth. The Laccadivians, Maldivians, Batnians, Gookers, and several other local communities of the ancient Hindoos, have lost the purity of their blood, by mixing with Mahometans from Arabia and Persia. Some Hindoo tribes have, without mingling with others, either degenerated from the primitive character of the nation in the sequestrated abodes which they have chosen in the midst of mountains and forests, still preserving traits of coincidence sufficient to identify their origin; or else they retain a character still more ancient than that of the other Hindoos, and which has never become thoroughly conformed to their widely predominating polity. Such are the Nepâlese, the Kookics, the Gonds, the Bheels, the Kallis, and other similar hordes, whose mode of life has separated them from the civilized mass of their countrymen. Herodotus speaks of a savage tribe of this description under the name of *Padæi*, who not only ate raw flesh, a general characteristic of savage hunters, but even killed and devoured the bodies of their relatives when exhausted by age and infirmity, a custom which was probably the result of some fixed law, or transmitted by traditionary precept. The same horrible custom is said to prevail to this hour among the Battas in the north of Sumatra, a people afterwards to be described. Knox accuses the Bedahs of Ceylon of cannibalism. The ancient books called the Puranas mention a cannibal tribe which lived in the forests of Indostan, and was called in Sanscrit Vyada, a term which originally signified "tormentors," and "man-eaters," though now employed simply to denote "hunters." Whether these common features of resemblance are to be considered as denoting a community of origin, or are merely the effect of an independent but similar set of causes moulding the human character in different places to the same pattern; these races are to be viewed as most probably bands of savages whose mode of life withdrew them some way or other from the influence of the laws of Menu, by which the great mass of the Hindoo nation was united in one political and religious community.

The genuine Hindoos being the most numerous, as well as the most remarkably artificial, claim our most particular attention; and, although in the preceding details several traits of their character have presented themselves, they are worthy of a more regular description in this place.

The Hindoos may be considered as belonging to the first variety of the human race. In the form of the cranium, the features of the countenance, and the proportions of the limbs, they resemble the European nations more than they do the Persians and the Arabs. But their complexions are almost black in the south of the Peninsula, and, though lighter in the northern mountains, they always retain an olive tint, and do not partake of the white and red of the Europeans.

The languages spoken by the different Hindoo tribes form a family of dialects mutually akin and widely diffused. Their common source, or rather their most ancient form, is the *Sanscrit*, or *Samskrada*, in which all their ancient books are written. It is said to be remarkably perfect in its structure. From this springs the Cashmerian, which makes the nearest approach to the ancient Sanscrit, and preserves its written characters; the Marashta language, or that of the Mahrattas; the Telinga, which is spoken in Golconda, in Orissa, and on the banks of the Krishna, as far as the mountains of

[a] Paterson on the Chronology of the Magadha Emperors of India, and the epochs of Vikramanditya, &c. Asiat. Reg. vol. IX.

[b] Edinb. Review, vol. XX. p. 455. XXIII. p. 42.

[c] Colebrooke's Memoir on the Vedas, Asiat. Researches, vol. VIII. p. 493.

[d] The population of Indostan has been differently stated. Mr. C. Butter rated it in 1813, at little short of 200 millions. Mr. W. Hamilton, in his Gazetteer, at 101 millions; of which 53 millions are in British Indostan. The marquis of Wellesley, has recently stated the population of British India at only 40 millions.—P.

[e] Wahl, II. p. 866.

[f] "Tatars and Moguls."

[g] The Belooches are said to have an affinity in language, personal appearance, and institutions, to the Afghâns.—P.

Balaghaut: the Tamul, or Malabaric, which prevails on the shores of the Deccan from Cape Comorin to the north-eastern extremity of the coast of Coromandel, and along the Malabar coast to the northern limits of the Concan; and, finally, the Hindostanee, which, next to the Sanscrit and Cashmerian, seems to be the purest Indian language. It is also called the *Nagari* or *Devanagari*, a term, however, which rather denotes the character in which it is written than the language itself. It is divided into several dialects, the purest of which is called *Wradsha*, and is spoken in the neighbourhood of Agra and Mathra. This dialect of central Indostan, mixed with that of the Afghâns, or Patans, and with that of the Mongolian[a] armies, has given birth to the idiom formerly spoken at the Mogul court, and still prevalent among the Mahometans of India. It should be called the Mongol-Hindostanee, but is generally known by the name of the Moorish or Moors' language. The other dialects are those of the Punjâb and of Guzerat, which last is spoken not only in that country, but also in Sinde, at Surat, and among the mountains of Balaghaut; those of Nepâl, Assam, Bengal, and Balasore, which last extends over the coast of Orissa as far as Coromandel.[b c]

Amidst the uncertainties which abound in the researches of the learned, the following facts may be considered as established.

The Sanscrit, that dead language in which most of the sacred books of the Hindoos are written, approaches, both in its roots and its inflexions, to the Zend, the Persian, the Greek, the Latin, and even to the Teutonic or old German, the Gothic, and the Icelandic.[d] These affinities are equally surprising, whether we consider their decided character, or their wide diffusion. The Sanscrit form of the verb is in some parts identical with that of the Latin, in others with the Greek.[e] Roots not found in the German dialects are common to the Icelandic and the Sanscrit, though separated by a fourth part of the circumference of the globe.[f] These remains of a vocabulary and a grammar common to so many nations, seem to prove, either that they descend from one common source now lost, or that, at a remote epoch, the people who spoke them have had mutual ties of friendly and commercial intercourse,[g] which are not easily conceived, yet cannot be denied. The Sanscrit is written with fifty-two letters, for several of which we have no corresponding characters in Europe. It has also thousands of syllabic abbreviations. Harmonious and grave, with a just proportion of consonants and vowels, rich in terms, free and flowing in its pronunciation, possessing numerous conjugations, tenses, cases, and particles, this language may be compared to those which we regard as the most perfect and refined original tongues.

The Pracrit, or "softened language," is spoken by the females in the drama of *Sacontala*, while the men speak the Sanscrit. Under this denomination may be included all the common dialects, of which the learned Colebrook believes he has made out ten distinct and leading varieties, viz. 1. The *Saraswata*, spoken formerly in the Punjâb, and on the banks of a river of that name. 2. The *Canyacubja*, or the dialect of Canoje, the source of the modern Hindi, from which is derived, by a mixture of Arabic, the Hindostanee. 3. The *Gaura*, or dialect of Bengal, of which Gaur was the capital. 4. The *Maithila*, spoken in Tirhut and some adjoining districts, and closely allied to the preceding. 5. The *Utcala*, used in the province of Orissa. 6. The *Tamla* or *Tamul*, the language of Dravira Proper, or the countries south of the Krishna. 7. The *Maharashtra* or *Mahratta*, which, besides various intermixtures, contains words of peculiar and unknown origin. 8. The *Carnata*,[h] spoken in the ancient Carnataca. 9. The *Telinga*, called formerly *Kalinga*, and used in Telingana. And, 10. The *Gurjara*, or dialect of Guzerat.[i] These languages must have belonged to a corresponding number of distinct civilized nations; but the enumeration is not complete. The *Punjabi* and the *Mathara* are not the only dialects which must be added to the list.[k] The *Maghada* deserves to be particularized as an ancient Indian language, being that of Bahar, the native country of Buddha. The priests of this deified prophet seem to have employed it; and it is undoubtedly the ancient Pali known to the Ceylonese and the Birmans.[l] We must also add the *Païsachi*, which seems identical with the *Apabransha*. This, according to some, is a jargon formed by the poets, and put into the mouths of foreigners; according to others, it is the language of the mountain tribes, whose origin is different from that of the Hindoos; a difference of opinion which can only be settled by farther researches.[m]

The Hindoo nation continues to be divided, as it has been from the most remote antiquity, into four *tchadi*, or what are best known to us by the name of "castes," a Portuguese term, which all the Europeans have adopted to express these classifications. Each has its peculiar privileges, duties, and laws. The more honourable the caste is, the more numerous are the restrictions under which its members are laid, and the prerogatives which it enjoys are the more valuable. The fourth caste has the fewest observances to follow, but it has also the least portion of respect, and is the most limited in its rights. Every individual remains invariably in the caste in which he is born, practises its duties, and is debarred from ever aspiring to a higher, whatever may be his merit or his genius. Cruel are the penalties which await the person who ventures to dispense with the most absurd of the rules laid down by the law of his caste. To this point of honour the Hindoo patiently sacrifices health and life. A Brahmin

[a] "Mongol-Tatar."
[b] Adelung's Mithridates, B. I. 183—232.
[c] The language of Balasore is that of Orissa, the Uriya.—P.
[d] Wilkin's Sanscrit Grammar. London, 1808. Paul. de St. Bartholomé, dissert. de antiq. et affin. linguarum Zend. Samscr. et German. Adelung, p. 149.
[e] E. Schlegel, sur la langue et la sagesse des Indiens.
[f] Mem. dans les Annal. des Voyages. See also p. 308 of this volume.
[g] "Rapports de voisinage et de commerce," relations arising from vicinity, as well as commercial intercourse. These may be explained by the supposition that the nations of Europe originally emigrated from the W. of Central Asia.—P.
[h] "Carnataca," Canara.—P.
[i] H. T. Colebrooke on the Sanscrit and Pracrit languages, in the 7th volume of the Asiatic Researches, p. 10.
[k] Edinburgh Review, vol. IX. p. 292.
[l] The Pali is the language of the sacred books of the Buddhists, in Ceylon, Siam, the Birman Empire, and Thibet; in the three last of which it is radically distinct from the vernacular language.—P.
[m] Colebrooke, and the Edinburgh Review, *loc. citat.*

of Calcutta, while labouring under a severe disease, had himself exposed on the banks of the Ganges, where he passed some hours in contemplation and prayer. He waited, motionless, for the tide to advance and bear him into the sacred waves, where a death the most blessed that imagination was able to figure awaited him. A party of English people passed near him in a boat, one of whom, commiserating the situation of a person whom he believed to be falling a victim to some unfortunate accident, took the Brahmin on board the boat, recalled him to animation by administering a cordial, and brought him to Calcutta. His brother Brahmins now pronounced him infamous, degraded from his caste, and unworthy of being spoken to by any Hindoo. It was to no purpose that the Englishman showed by undeniable testimony that the fault was his, and not the Brahmin's, whom he found in a state of utter insensibility. The law of Menu was inflexible; he had received drink and food from a stranger; for this he must be deprived of all his means of subsistence, and condemned to civil death. The English courts of justice devolved his maintenance on the person who had saved his life. Deserted by all his friends, followed every where by demonstrations of contempt and scorn, the unhappy Brahmin dragged out a miserable existence for three years. Seized after this interval with a new attack of disease, he again determined to die by his own hands, a resolution which his now impoverished benefactor did not prevent him from putting in execution.—This anecdote, which is perfectly authentic, delineates the intolerance of the Hindoos in enforcing the laws of caste. These laws are scrupulously enjoined by a code at once civil and religious, which has been in force for thousands of ages, and the rigour of which the Hindoos have never thought of moderating.

The leading castes, as we have already had occasion to observe, are four: 1. The Brahmins; 2. The Kshatriyas, or soldiers, including the princes and sovereigns, and sometimes called the caste of Rajahs, or Rajepootras; 3. The Vaisyas, consisting of agriculturists and shepherds; and 4. The Sudras, or labourers.

Amidst many subdivisions, local refinements or relaxations, uncertain claims, and infractions of the order arising from circumstances, the most certain and universal part of the system is that by which the rank and importance of the caste of Brahmins are maintained. This is the sacred or sacerdotal caste; and its members have maintained an authority more exalted, commanding, and extensive, than the priests of any other people. Their current tradition is, that the Brahmins proceeded from the mouth of the Creator, which is the seat of wisdom.—There are seven subdivisions of the Brahmins, which derive their origin from seven *Rishis*, or penitents, the holiest persons acknowledged by the Hindoos, and who are believed to have occasionally inflicted the effects of their sacred wrath on some of the gods, when guilty of debauchery. These personages are of high antiquity, and mentioned in the Vedas. Their residence was fixed in the retired regions of the north, and hence the Brahmins of the north, who are nearest to the great fountain, are esteemed the noblest. The Brahmins of antiquity were much more secluded than those of modern times, though the latter show a predilection for a life of retirement from the bustle of the world. They have made no alteration in their rules of abstinence, ablutions, and multiplied ceremonies. Their great prerogative is that of being the sole depositories and expounders of the Vedas, or sacred books. Of these there are in number four, and for each there is a separate order or branch of the Brahmins. They have a story in general circulation, that if a Sudra, or other profane person, should ever attempt to read the title of these books, his head would instantly cleave asunder. Yet it is remarkable, that they make an exception in these miraculous effects as applied to Europeans. A Brahmin bold enough to show these sacred volumes to profane eyes would incur the penalty of irretrievable expulsion from his tribe.

The great body of them profess to pay equal veneration to the three parts of the godhead, Brahma, Vishnu, and Siva. But some attach themselves exclusively, or with great preference, to one more than the others. The worship of Vishnu and Siva, in particular, become the objects of partiality with individuals, who form themselves into sects founded on these predilections. The Vishnuvites are called also Namadhari, from bearing on their foreheads the mark called *Nama*, consisting of three perpendicular lines joined by a crossing line at the base, so as to represent a trident. Their clothes are of a deep orange colour. The devotees of Siva are called Lingamites, from wearing the Lingam stuck in the hair, or attached to the arm in a gold or silver tube. The former are notorious for intemperance, and on that account, those of them especially who lead the lives of mendicants, are disliked by the people; while the Lingamites observe great moderation in eating and drinking. The Vishnuvites pay a high veneration to the ape, the bird called garuda, and the capella serpent.[a] Any of them who inadvertently kills one of these animals is obliged to expiate his crime by a ridiculous sacrifice, in which a human victim is pretended to be immolated and brought to life again; the fact is, that a little blood is drawn from a superficial wound in the thigh, inflicted with a knife; the individual lies still, apparently lifeless, till the farce of resuscitation is performed. This is done with immense ceremony, and gives occasion to a great concourse of people, who are feasted on the fine levied from the culprit.[b] A similar punishment is awarded for some other offenecs. Sometimes these two sects not only strive to exalt their own divinity, but revile that of their opponents. The Vishnuvites consider the wearing of the Lingam as the most heinous of all sins, while the Sivites maintain that all who bear the Nama shall, when they die, be tormented in hell by a three-pronged fork resembling that mark. These sectarian notions are less prevalent, however, among the Brahmins, than in the other castes. Vishnuvite Brahmins are only to be found in the provinces which lie to the south of the river Krishna; and they are viewed with contempt by the tolerant Brahmins, who will not admit them to their tables or to their ceremonies, nor will they confer on them any public employments which happen to be at

[a] Cobra de capello?—P.

[b] Abbe J. A. Dubois's Description of the Character, Manners, and Customs of the People of India, p 54, &c. (English translation.)

their disposal. These sects are farther split into subdivisions, which dispute warmly on the subjects of their differences, but are ready to unite whenever the general interests of the sect require their protection.

A Brahmin is subject to four different states. The first takes its commencement about the age of seven or nine; when the individual is invested with "the triple cord," a badge which hangs from his left shoulder, previously to which he is not considered as a Brahmin at all. The young man thus initiated is called Brachmachari. In this state his duty consists in learning to read and write, in learning the Vedas, and the efficacious forms of prayer called the Mantras; in acquiring other sciences, and abstaining from the use of betel. He uses no ornaments in his hair, bathes daily, and offers the sacrifice called the Homam twice a-day. Subjects so young do not in general observe the rules strictly. A certain proficiency is enjoined in learning the books by heart, but neither in this, nor in the acquisition of the lessons deemed by them scientific, is there much general emulation. They learn afterwards to understand the different privileges belonging to their caste, and, among others, their right to ask alms, which they do not in the style of mendicants, but of confident yet not insolent claimants. Another is exemption from taxes. They are also exempted from capital, and generally from corporal punishment, however heinous crimes they may commit, imprisonment being the only punishment to which they are liable. They learn all the points of bodily purity which, as good Brahmins, it is necessary to observe through life. Not only are they liable to be considered as polluted by the touch of a dead body, but even by attending at a funeral.

Childbirth and constitutional changes render females impure; and ablutions and forms of prayer are requisite to remove the stain. An earthen vessel, if ever it has been used by a profane person, or applied to any one of a specified number of uses, becomes so polluted that it cannot be used again, and must be broken; metallic vessels admit of purification by washing. Leather, and every kind of skin, except those of the tiger and the antelope, are held to be very impure; hence the boots and gloves of the Europeans are in their eyes the most disagreeable of all objects as articles of dress. A Brahmin must take care, in walking or sitting, that he does not touch a bone, a broken pot, a rag, or a leaf from which any one has eaten. In drinking, they must pour the liquid from above, without touching the vessel with their lips.* They must not touch the greater part of animals; the most polluting is the dog. The water which they drink must be carefully drawn, and by no means by any Sudra. If two Brahmins draw water together, their pitchers must not touch one another, otherwise one or both must be broken. They must eat no animal flesh, nor eggs. This is particularly the case with the Lingamites, yet this sect is remarked for great external slovenliness in their habits. The Brahmins are also taught to entertain a horror for defilement of soul, as the consequence of perverseness of the will, or sin; and, though the particulars of which such defilement consists are obscurely explained, the rules for purification by ablution, penances, and ceremonies, are both precise and ample.

The second stage of a Brahmin's life is called that of Grihastha, and takes place when he is married and has children. Mere marriage does not constitute this state, for that ceremony takes place at a very early age, and the parties remain for some years in the houses of their respective parents.

Marriage is an essential object to a Brahmin, being necessary to any sort of respectability in society. When he becomes a widower, he falls from his station, and is under an urgent necessity of resuming the married state. The case is quite different with widowed females, who are not permitted to marry a second time. There are, however, some hermits or penitents called *Sannyases*, who lead lives of celibacy, and the acting priests, who are called Gurus, also live in a single state, though it is known that their morality in this particular is sufficiently relaxed. There is no such thing now as celibacy adhered to among women from any religious motive; but their ancient books, speaking of the *five celebrated virgins*, intimate that in former times there were religious nuns. Marriage is conducted in the same manner which we have already described in our account of local manners. The parents fix the alliance which is to be formed, and the wife is purchased by the bridegroom for money. The money given, however, is employed by the father of the lady in the purchase of ornaments for his daughter; and these become the unalienable property of the wife. The father does not give his answer to any young man's offer till one of the small lizards which creep on the wall gives, by one of its chirps, a favourable augury. The ceremony of marriage is operose, and lasts five days. There is a set of functionaries called Parohitas or astrologers, who go through the various ceremonies on this and some other interesting occasions. The gods are propitiated by sacrifices, particularly *Vishneswara*, "the god of obstacles," who is feared on account of the power which he possesses to thwart the plans of human prudence. This image is set up in the *Pandal*, a sort of alcove erected in front of a Brahmin's house. When he takes his wife home, and has children by her, he is now in his second state, that of a Grihastha; his daily duties and ceremonies become more multiplied and more strictly incumbent. Every act of his life is to be performed according to certain rules, some of them very foreign to all European notions of propriety. They consider some of our customs as highly abominable, such as that of blowing the nose and stuffing the excreted matter into the pocket. While the act of cleaning the nostrils, and some others considered as conveying an impure stain to the individual, are performed, a Brahmin never omits the ceremony of putting his cord over his right ear, which is supposed to have the virtue of purifying him from corporeal pollution. The cleaning of the teeth is performed with a well chosen piece of wood, fresh cut from the tree; to rub them with brushes made of the hair of animals, is an act of indecorum to which nothing whatever would make him descend. When he bathes, he thinks of the Ganges; and on coming out of the water, salutes each of his fingers and toes, and all the parts of his body in detail. Several regular days of

* Abbé J. A. Dubois's Description of the Character and Customs of the People of India, p. 112. (English translation.)

fasting are observed in the course of the year, which amount altogether to a considerable space of time. These, and many other burdensome observances, become so habitual, that nothing galling is felt in submitting to them. They go through them all with cheerfulness, and no innovation in them is ever proposed. Some philosophers among the Hindoos have turned them into ridicule, but even these do not omit them in practice. The Abbé Dubois observes that those authors who have ridiculed them in their writings, were never, so far as he could learn, Brahmins, but generally Sudras. *Vemana*, *Agastya*, *Patanatupulai*, and *Tiruvaluven*, a Pariah, the chief authors of this description, are modern. If any ancient ones wrote in the same strain, their works are not now to be found. Transgressions in practice, however, are secretly indulged in, especially in large towns, where concealment is most easy. Many of the Brahmins engage in employments which appear incongruous with their general professions. They are usually the political functionaries of the native princes and of the Mahometan governments, which find it convenient to manage the people through their medium. Some of them, particularly in Guzerat, engage in commerce. They often carry messages between distant places, an employment very convenient for them, as the veneration in which they are held prevents any lawless person from molesting them. Sometimes they act as *coolies* or porters, in which character they are exempt from the molestations of the officers of the revenue. They are certainly an artful set of impostors. The Hindoos are all expert in disguising the truth, but the Brahmins much more so than any other. Flattery is one of their prime resources, which they lavish in the most extravagant manner on any person from whom they have a favour to expect. One of the features which we contemplate with the greatest pleasure, is their toleration in religious opinion. They do not anathematize Mussulmans, Christians, and others, with the decision which generates an impatient spirit of proselytism or of persecution. This is ascribed sometimes to the low estimation in which they hold the objects of their own worship, and, undoubtedly, they sometimes treat the latter with an indifference bordering on contempt, and in their adorations, are influenced by their secular interests rather than by the spirit of devotion, flattering those divinities whose functions they connect with their secular concerns. The distance at which they keep themselves from the Europeans, and their unwillingness to admit them to their temples or their ceremonies, arise from the uncleanness which they attach to the habits of the latter, who, if they would conform a little to their manners and practical prejudices, would experience from all the Hindoos unbounded toleration. It is a very prevalent sentiment among them, that different religions are formed for different nations, and that each serves every purpose to the souls of its believers and professors. The excellent Abbé Dubois, who studied the manners of the Hindoos more carefully than any one who describes them, was, in consequence of the tenderness and respect with which he always treated their habits, often invited by the Brahmins, to whom he and his mode of living were known, to enter their temples, and join them in their ceremonies. The Brahmins entertain an unbending spirit of bigotry, however, in their attachment to their civil institutions, considering every thing different from them as worthy of none but barbarians. The Moors they hate for their arrogance, and despise for their ignorance of some physical branches of science known to themselves, such as those which are connected with the construction and explanation of the almanac. They think well of some good qualities of their European masters, such as their humanity in war, the moderation and impartiality of their government, and their other benevolent features; but they soon forget these favourable impressions, when they think of the grossness and hatefulness of some of their prevailing habits. M. Dubois thinks that the latter ought to have denied themselves the use of beef, which is an insipid food in that country, and should not have admitted the detested Pariahs into their domestic service. It would, indeed, be wrong to countenance them in their inhuman treatment of the inferior castes, and of persons who are considered as of no caste; yet regulations might have been adopted by which the gross insult which the present modes imply might have been avoided or modified, and every humane purpose obtained.

The third state of a Brahmin is that of Vana-Prastha, or that of the inhabitants of the desert. This order prevailed at a former period, but it is now scarcely to be found, and appears indeed to be extinct. These were the same persons whom we commonly call penitents. They were honoured by kings, and respected by the gods, who are said to have considered them as a sort of superiors. They observed a number of peculiar rules of self-denial, and practised peculiar sacrifices and religious observances. It was imagined that their pious acts and intentions were often thwarted by giants and even by gods. They were the depositories of some of the sublime doctrines of theology, and practised magical incantations. These last are now taken up by other individuals, who, on account of their supposed power, are frequently held in a sort of horror.

The fourth state of a Brahmin is called Sannyasi, which is reckoned so peculiarly holy, that it imparts in a single generation a greater stock of merits than ten thousand could produce in any other sphere of life. A Sannyasi, when he dies, is believed to pass straightway to the world of Brahma or of Vishnu, exempt from the penalty of being ever re-born on earth, or passing from one body into another. He performs all the rigid rites of the Vana-Prasthas, and in addition, renounces all worldly connexions, takes up the profession of mendicity, and lives solely on alms. Before this, however, he must devote several years to the married and paternal state, and thus discharge a debt which he owes to his forefathers. When a Brahmin is qualified and disposed for this state, he is installed in it with many mantras and other ceremonies. He must now, every morning, rub his whole body all over with ashes; must restrict himself to one meal in the day; give up the use of betel; avoid looking at women; shave his beard and head every month; wear wooden clogs always on his feet; must, in travelling, carry in one hand his seven-knotted bamboo staff, in the other his gourd, and the antelope skin under his arm, these being the three badges of his

order. He must erect a hermitage on the bank of a river or a lake. Such is a specimen of his regulations. Contemplation, and a supposed communion with the Deity, amounting, in its highest form, to a participation of a divine nature, are the ulterior duties of this class of devotees. Nothing can exceed the fantastic exercises in which they engage, such as suppressing their breath for as long a time as possible, till they are almost in a swoon, thus bringing on violent perspiration. These efforts are made during the night, and succeeded by endless wanderings of the imagination, to which they blindly attach a superlative value. They put themselves in the most irksome and ridiculous postures of body, such as standing long on one leg till it swells and ulcerates; standing also a long time on the head. The act of highest merit among them is "to subdue all sensations, and retain the breath with such determined perseverance, that the soul, quitting the body, bursts through the crown of the head, and flies to re-unite itself with the great Being, or Para-Brahma." The tricks which they perform are endless, but their most extravagant and fatal efforts are said to be confined to former times. The Sannyasis are not, like the Vana-Prasthas, burned when they die, but are interred. This is the case with the Lingamites, or worshippers of Siva; but a Sannyasi, even though during life he has attached himself to the worship of Vishnu, is interred when dead, and the ceremony is pompous and expensive, being done at the expense of some relation or friend, who reckons the act in the foremost rank of good works.

From the classes of Vana-Prastha and Sannyasi have issued numerous sets of fanatics, such as the Djogis, who exert themselves to please the Deity by strange mutilations of their bodies, braving the force of fire, and the extremity of the seasons; the Panduris, who disseminate little figures of the most indecent description, as subordinate to devotion; the Vairagis,[a] who are a sort of order of monks and nuns, consecrated to the god Krishna and his mistress Rada, whose history they celebrate with songs, accompanied by the noise of cymbals. It is said that some, even of the Brahmins, under the name of Pashandia and the Sarwagina, maintain opinions completely libertine and atheistical.[b]—To some respectable travellers, it appears, on the whole, that the number of persons of the Brahminical caste who are respectable for their knowledge and their virtues is very small, while the great body of these hereditary priests and sages are completely devoted to ambition, intrigue, and voluptuousness,—their character being disgraced by an avarice, a meanness, and a cruelty, which inspire a stranger with no sentiments towards them but those of contempt.[c] The charity which they hold so high in the list of duties and of virtues, has no human beings except Brahmins for its objects. Towards the other castes they cherish no feeling of humanity, but claim every thing from them, while they give them nothing.

The caste immediately beneath the Brahminical is that of the Kshatriyas,[d] or the military class. They are also called Rajepoots,[e] from being the descendants of rajahs or princes. Encroachments, however, seem to have been early made on the prerogatives of this class; the military profession being embraced by inferior castes, according as necessity obliged the governments to employ them, or lawless propensities led individuals to lead lives of habitual violence, till they became established in the military profession by the success of their insurrections or incursions. The Rajepoots are now rather a tribe than a caste. They claim, and generally receive, a greater degree of respect than other warriors. In this tribe, as in the military body in general, the feebleness and insignificance of the Hindoo give place to a ferocious courage, a savage ambition, and an insatiable avarice, rarely compensated by any real virtues, or even by that generosity of conduct which so frequently accompanies the military character among Europeans.

The Vaisyas[f] are the third caste of the Hindoos. Their duties consist in the labours of the field and the garden, the breeding of cattle, and the sale of landed produce.[g] When these Vaisyas travel to other countries in mercantile pursuits, they go under the name of Banyans.[h] They are privileged with exemption from military duty; but since the Indian princes have been in the practice of maintaining mercenary troops, many of this caste have become soldiers. It is of them that the Mahrattas in general consist. They are bound to pay the profoundest respect to Brahmins and to Kshatriyas, but they receive the same awful submission from the caste next to be described.

This is the fourth and most numerous of any, and is called the Kshoodra, or Sudra caste.[i] The business of this caste is servile labour, and wherever the original spirit of the institution has not been infringed on by a train of political accidents, their degradation is inhuman. They are compelled to work for the Brahmins, being considered as created solely for their use. They are not, by the laws of Menu, allowed to collect property, "because such a spectacle would give pain to the Brahmins." To them the Vedas must never be read, nor spiritual counsel given; and whoever shall dare to instruct them in the mode of expiating sin, is doomed to sink with them into Asamvrita, one of the hells with which the world of spirits is provided.

Any one of the three higher castes, though possessing their separate spheres of occupation, is allowed occasionally, and under circumstances of necessity, to engage in the employments which belong to the inferior castes; but the latter are in no case permitted to interfere with those of the superior. Hence in times of distress, the Sudras are subjected to peculiar sufferings from being thrown out of employment by swarms of interlopers from all the other castes, while to them no corresponding resource, either then or at any other time, is open.

In consequence of irregular intermarriages occurring among the different castes, children were born who be-

[a] Beraghis or Beerajes.—P.
[b] "The Pashandia deny the existence of the gods, and the Sarwagina that of a special providence."—M. B.—P.
[c] Solvyns on the Hindoos. Lord Valentia's Travels.
[d] "Chatri, Tschatri, Kehteri, Koytri." Cheteree.
[e] "Rashoutes, Radchapoutes, i. e. sons of princes."
[f] "Vaichies, Beises, Vassiers," Bice.
[g] "And of manufactures."—M. B.
[h] "When the Vaisyas devote themselves to commerce, particularly in foreign countries, they go under the name of Banians."—M. B.—P.
[i] "Souders, Choutres Tchoutries," Sooders.

longed to no caste, and for whom there was no employment. These were called Burren Sunker.[a] They lived either on charity, or by plunder, and acquired a savage and lawless character. For them different new arts and manufactures were ultimately contrived, by which, from being the pests of the community, they were converted to its service. Thirty-six branches of this impure class are specified in the sacred books,[b] differing in the elements of their spurious origin, and in the degrees of humiliation attached to the labours respectively assigned to them. All of them are obliged to keep at a great distance from the rest of society.

Various circumstances, however, have in different places produced more or less intermixture and encroachment of the castes on one another. Hence the purity which they claim is not always conceded to them by others who pass under the same name. Many of those who occupy the place of the higher castes, with the exception of the Brahminical, are by birth entitled to no higher rank than that of Sudras.

But beneath these, and beneath even the Burren Sunker, there is a race of most degraded and universally insulted outcasts, called Pariahs, whom we have more than once had occasion to mention. In many places, their very approach is sufficient to pollute a whole neighbourhood. They must not enter a street where the Brahmins live. When they transgress, the higher castes will not assault them, for it is pollution even to touch them with a long pole; but through the medium of others, they beat them at pleasure, and have often put them to death without dispute or inquiry. The degree of this detestation in which the Pariahs are held is the greatest in the southern parts of the peninsula. The Europeans, however, are under the necessity of employing them as domestic servants, as a great part of their work could not be done by persons of any other caste; such as the cooking of beef, the pulling off and cleaning of boots. This arrangement is attended with the disadvantage of preventing individuals of reputable character from engaging in the service of a European, for fear of being confounded with the Pariahs. They act as scavengers; they have the care of distributing the waters of the tanks over the fields. Some have the charge of domestic animals. Of late they have been occasionally admitted into the European and Indian armies, where they have given considerable satisfaction to their masters. They are not inferior to the other Hindoos in courage, but cannot without great difficulty be subjected to military discipline, and are abandoned to all sorts of vice and irregularity. They are as coarse and sensual as the Brahmins are refined and knavish. Their features are harsh and rugged, their manners gross. They get drunk on the juice of the palm when it is in a state which gives them a most offensive odour. They engage in frequent quarrels, treat their wives with cruelty, often beating them brutally even in a state of pregnancy. They feast on any rotten carcass that falls in their way. In order that a race so abominable may be deprived of every chance of conveying contamination to their superiors, they are obliged to have their wells surrounded with the bones of animals, to warn others against making use of the same water.

Besides the Pariahs, who are spread over all the provinces, there are other local outcasts, some of whom are still more debased. Such are the Pallis of Madura, and the Pulias in the mountainous parts of Malabar, who are not permitted to erect houses, are obliged to live in open sheds supported by bamboo pillars, and dare not even walk along the common road for fear of defiling it.

The shoemakers are every where held inferior to the Pariahs, and are in reality of a grosser character, and more destitute of honour. Players on wind instruments, and all sorts of vagrants, are also despised and hated as a portion of the infamous dregs of Hindoo society.[c]

The religion of the Hindoos is so intricate and cumbrous in its legends, and so inconsistent in its doctrines, as to defy the powers of analysis; and for the same reason, it becomes too absurd to merit much interest, except as a conspicuous monument of the weakness of the human understanding, and a leading political engine in full operation. From some detached expressions in their writings, apparently mystical and sublime, the Brahminical religion has been supposed to be originally founded on just and elevated views of divine power.—We have already mentioned the Trimurti, or Indian trinity, consisting of Brahma, the creator; Vishnu, the preserver; and Siva, the destroyer. Some have been impressed with sentiments of respect for the views thus unfolded, though imperfect, and corrupted. They have even been considered as participating of doctrines bearing a relation to the catholic theology. But when we enter more largely into the Hindoo mythology, we find that this trimurti is not eternal, but sprung from a female, who is known by a name signifying "the original power." We find the trimurti engaged in shameful amours, subjected to humiliation and disgrace, and restored to its dignity by the good nature of a virtuous female, who had punished it for an unsuccessful attempt at seduction. The trimurti is introduced into the first pages of the Edda of Snorro. The perpetuity of manners, as well as of ideas in India, is strikingly exemplified in their adherence to the same sacred emblems by which their views were originally represented. Hence we see the strange figures with four heads and eight arms, the frightful visages, the monsters which tear men in pieces, and all the horrid and disgusting oddities which characterize the representations of the Indian deities. What a shocking contrast to the graceful conceptions of the Grecian imagination! They show that the system existed previously to the formation of a correct or elegant taste: but they are not on that account as some have alleged, conclusive, or independent proofs of its high antiquity. In some instances we must allow that these symbols are sufficiently expressive. Vishnu, the preserving principle, holds in one hand a leaf of the lotos, which is an aquatic plant, to show that every thing is sprung from the sea. The horn which he holds in another hand denotes his creative voice, which is capable of animating the chaotic void. The club in a third, indicates his power to punish and destroy the

[a] Burum-Sunker or Warna-Sankra.

[b] Colebrooke on the Indian Classes, Asiat. Researches, Vol. V. p. 53.

[c] See Abbé Dubois's "Description of the People of India," p. 454—476. (English translation.)

wicked. The wheel in a fourth, is the symbol of the eternal circle of life and creation. The triple crown on his head, teaches that he reigns over the sea, the earth, and the atmosphere.

The god Brahma is described as a much more scandalous character than even the Jupiter of the Greeks.[a] Vishnu, the redeemer or preserver, has, in order to execute his incumbent offices, been obliged to appear in different earthly forms, called *avataras*, of which ten are enumerated. First, he was transformed into a fish; second, into a tortoise; third, into a boar; fourth, into a monster, half man and half lion; fifth, into a dwarf Brahmin; sixth, into the god called Paraswarama; seventh, into the hero Rama; eighth, into the god Krishna; ninth, into the tree ravi, or aruli. This is the last which has taken place; but another is yet expected, to which the Hindoos look forward with the same ardour as the Jews to the coming of the Messiah. This is a transformation into a horse. The books do not assign the period of its arrival, nor explain by what means it will be brought about; but the Hindoos trust that it will restore the Satya-yuga, or the age of happiness. Each of these avataras is the subject of a curious but monstrous fable.[b]

The god Siva, who is chiefly characterized as the destroying power, is generally represented under a shape so contrived as to inspire terror, with large impassioned eyes, his ears decked with serpents, his hair plaited and curled in an extraordinary manner, and holding the weapon called *sula* in his hand. His amours, and his battles with the giants and tyrants of the earth, in which the four Vedas or sacred books were his horses, the mountain Mandara Parvata his bow, and Vishnu his arrow, and who, in order to prepare for battle, cut the world in twain, and took one half of it for his armour, are related in the book called the Bhagavata, which in fame is next to the Ramayana. In order to obtain a wife, he subjected himself to a long and austere penitence, and thus prevailed on the mountain Parvata to give him his daughter Parvati in marriage. The origin of the worship of the Lingam is connected with a ridiculous passage in the story of this god's debauchcries. The Bhagavata is a book of matchless obscenity; yet it is the delight of the Hindoos, and the first which they put into their children's hands, when learning to read. Vishneswara, the god of obstacles, derived his birth from the excrement of Parvati, and his head being cut off by some malignant deity, was replaced with the head of an elephant by the power of his father Siva.

The Hindoos are more extravagant than even the ancient Egyptians in the worship of animals, as they make almost every living creature the object of devotion, although some species excel the others in the interest which they excite. Such are the cow, the ox, the ape, the serpent capella, and a bird of prey called garuda. They worship also a variety of malignant demons under the name of Bhuta.

The doctrine of the transmigration of souls from one body into another, is an essential dogma of the Brahminical faith, and from this source the Grecian philosopher Pythagoras undoubtedly derived it. It was under this belief that Pythagoras prohibited his disciples from eating the flesh of animals, as implying cannibalism, or even the devouring of one's own ancestors; and for the same reason the Hindoos deem it sinful to put any animal to death, except when offered in sacrifice; but it is well known that in this, as in many other particulars, their practices are inconsistent, and that they have among them both butchers and hunters by profession. The Hindoos recognise two leading causes of transmigration; one is for the punishment of transgression, and the reward of virtue, by sending the wicked into the bodies of Pariahs, or of mean and wretched animals, and those of the righteous into bodies of the happiest and most dignified kind. The other is for the purpose of removing the impurities implied in particular generations, which can only be done by many more transmigrations, if, instead of purifying themselves from old stains, they contract new ones by a dissolute life.

They maintain the existence of a hell, in which, as in that of the Greeks, some whimsical punishments are awarded, such as plunging the guilty souls several times a-day in a lake of mucus. The retributions of that hell are long and severe, but not eternal. They are supposed to be succeeded by a universal restoration of the world.

We have already found that some of the ceremonies of the Brahminical worship are horrible in the extreme, such as the worship of Vishnu, under the name of Juggernaut.[c] Some of them are more tumultuous and licentious than the worship of Bacchus himself, and accompanied with prostrations before the most immodest figures[d] exhibited as sacred emblems. Ablutions and purifications form a leading part of Brahminical devotion. The images of the gods are purified by bathing them in the rivers, or the sacred tanks. Fire is held in religious veneration, and receives frequent offerings of butter thrown into it.[e] Every Brahmin cherishes a sacred fire. The sacrifices chiefly consist of vegetable substances, but animals also are often immolated, and even in the last century the ancient popular superstition which authorizes human sacrifices in extreme cases was countenanced by some ignorant Brahmins. The burning of widows is a relic of these horrid sacrifices, and still, in epidemic diseases and other public calamities, it sometimes happens that Brahmins are sufficiently foolish and sufficiently disinterested to throw themselves from the top of a tower, in order to propitiate the mercy of a divine being in favour of their cotemporaries.

An infant, as soon as it enters the world, becomes a subject of religious ceremony. The Brahmins give it a name, and fix, by the study of the stars, its future destinies. The Hindoo marriages are celebrated by a Brahmin with much ceremony. A piece of cloth is held extended over the pair while the priest[f] implores

[a] A specimen of his nefarious conduct is given by Dubois, p. 429, 430.

[b] Dubois, ibid. See also an excellent account of this, and other parts of the Hindoo mythology, in Murray's Historical Account of Discoveries and Travels in Asia, vol. II. p. 251, &c

[c] See page 476 of this volume.

[d] The Lingam.

[e] Fire holds a very important place in the worship of the Hindoos. They purify it, and then throw into it offerings of butter, repeating thrice, in addressing the earth, the air, and the heavens, "may this offering be efficacious!"—M. B.—P.

[f] Bramin.

the blessing of heaven on their union. Promises of unalterable fidelity, written on palm leaves, are mutually exchanged.

The funerals are accompanied by some curious observances. A dying Brahmin is laid in the open air on bed of cusa grass, is sprinkled over with the holy water of the Ganges, and verses of the Vedas are chanted over him. When his breath is gone, the body is washed, perfumed, and crowned with flowers. The funeral pile is lighted with a match from the sacred fire, by which the body is purified and fitted for ascending into heaven.[a] The following are some of the verses chanted on such occasions:

"It is folly to expect any thing permanent in the lot of man, which is empty[b] like the trunk of the banana, fleeting like the froth of the sea."

"To receive the due recompense of its actions, the human body, composed of five elements, returns to its native principles; and what occasion have we for lamentation?"

"The earth perishes; the sea, and even the gods, pass away; yet vain man aspires at immortality."

"Whatever is low must disappear, whatever is high must fall. Every compound being must be dissolved, and life must end in death."

The relations of the deceased collect the ashes, which are put up into a parcel with the leaves of the *Butea frondosa*, are first consigned to the earth, and, after a time, thrown into the Ganges with a new set of ceremonies. Sacrifices of cakes are offered to the manes of the three nearest progenitors by the father's and the mother's side.

The building of temples is reckoned an act of great merit among the Hindoos. Elevated grounds are the situations chosen for these buildings. Most of them are miserable structures, resembling ovens rather than places of worship. Some of them are used as courts of justice, and choultries for travellers, as well as temples. The larger temples, or pagodas, however, sometimes exhibit a magnificent architecture. Their form is always the same. The gate of entrance is cut through a huge pyramid fronting the east. In those of the first order there is a large court beyond the pyramid; at the end of this a second gate, cut through another massy pyramid less lofty than the first, leading to another court, at the end of which stands the temple for the residence of the idol. In the middle of the second court a figure is placed in a niche or on a pedestal. This is a cow, a bull, a lingam, a serpent, or some other object of worship, to which some mark of reverence is paid by all the votaries who visit the place. They are now admitted into the temple by a low narrow door, which is the only entrance for air and light. The interior is divided into two or three apartments, all on a level. But here the air is polluted and noxious in the highest degree, from the smell of burning lamps, and the effluvia of decayed flowers, as well as the repeated respirations of the worshippers. To unpractised persons, the horrid filth in which the divinities are kept is extremely disgusting. Here are the ugly and monstrous productions of a wretched art, before which the poor superstitious Hindoo prostrates both body and soul. Numerous figures are set up, both within the temple and around it, many of them clothed in splendid garments, and decked with precious jewellery, which heighten their grotesque and horrific aspect. In the best endowed institutions of this kind, numerous persons are maintained in an official capacity. The first in rank are the sacrificers, whose duties are numerous and daily. Next in importance are the Devadassi or handmaids of the gods; they have the charge of the sacred lamps, and generally are concubines to the Brahmins, and, in fact, low and abandoned in their morals. They dance and sing to the impure songs in which the licentious actions of their gods are celebrated. These persons are sometimes dedicated to this life by their parents, and are not considered as reflecting any disgrace on the family to which they belong. They are the only females who learn to read, to sing, and to dance. Such accomplishments are held in abhorrence by all the virtuous matrons of India. These women use the same arts, by means of dress and manners, which are employed by common women in other parts of the world, but without the glaring impudence which is practised in many parts of Europe. To the temples are also attached bands of musicians, who play with a kind of clarionets, cymbals, and drums. On the authority of the Abbé Dubois, we must believe that in some of these temples, scenes of indiscriminate debauchery are practised. Accounts of such scenes, even when described as existing among the nations of antiquity, have been rejected with scorn by the sceptical critics of modern times. Yet they are now in full operation in India. One temple of this kind is at Junjinagati, a desert place on the banks of the Cavery; another near the village of Kari-madai, in the province of Coimbatoor,[c] and another at Tirupati, in the north of the Carnatic. A sort of vows common among the devotees is that of suffering corporal mutilation or tortures. Some of these are described by Dubois, and would appear quite incredible, if not supported by testimony so respectable.[d]

After the particulars which have come in our way on former occasions, there is little to be stated on the subject of the dissenting religions in India, such as that of the Buddhists and the Jains.[e] The latter follow simi-

[a] "The funeral pile is lighted by a brand from the sacred fire, and they then supplicate the fire to purify the body of the deceased, so that it may ascend to heaven."—M. B.—P.

[b] "Without solidity."

[c] Dubois's Description, &c. p. 409, &c.

[d] Idem, p. 413, &c.

[e] The following are the principal distinctions between the Buddhists and the Brahmists. The former believe in periodical reformations, by men who have risen to the rank of gods by contemplation; in a quiescent deity, with active subordinate agents; and in the eternity of matter. They deny the authority of the Vedas and Puranas. They have no castes. Their priests are taken from all classes, may resign their office, do not marry, live in monasteries, and profess entire abstinence. They eat nearly all kinds of flesh. They do not venerate fire, and they offer no sacrifices. They venerate dead saints, as Buddhas. Their sacred language is the Pali. The latter believe in periodical reformations by incarnate gods, (avaters;) in an active deity; and in the creation of matter. They venerate the Vedas and Puranas; are divided into castes; and their priests are taken only from the caste of Brahmins, cannot resign, marry as a sacred duty, have concubines, rarely eat flesh and never beef, and live with their families. They venerate fire, and sacrifice some animals. The dead are impure. They worship only the gods. Their sacred language is the Sanscrit.—*Asiat. Journal.*—P.

lar doctrines to the Buddhists, but differ from them in allowing the Hindoo division of the community into castes.[a]

Mahometanism, as we have found, has many followers, and in some places gains proselytes. Judaism and Christianity have not made much progress. This is ascribed to the conduct of the missionaries, which has been too often impolitic and harsh, so as to inflame rather than conciliate the minds of the pagans.

The temples, palaces, and pyramids found in various parts of India, are considered as proofs of a former state of greater civilzation among this people than now exists; but these remains only show that some individuals had sufficient riches, or sufficient power to command an enormous expenditure of human labour, and sufficient ambition to project monuments which promised, by their magnitude, to subsist for many ages. Good taste is an ingredient rarely if ever found, and far less proof is there that civilization, in this particular, was ever prevalent in the community at large.

The sciences were cultivated in very early times by the Hindoos, the Brahmins being the only depositaries of knowledge. Besides the false sciences of astrology and magic, by means of which they impose on the ignorant, they also possessed some sound mathematical and astronomical knowledge, and were acquainted with some processes of algebraical calculation, which implied considerable patience and study. It is uncertain, however, in what degree these were original, and to what extent they were imported from Western Asia. These points are subjects of controversy among the learned: yet there is something creditable in having made them objects of attention. Some Hindoo books of algebra and arithmetic have been published in European translations; which consist rather in the adoption of such abridged methods as are found to give true results, than in the unfolding of scientific principles.

The literature of the Hindoos consists chiefly of poetry. All their ancient books are in verse. Even their books on medicine are not excepted. Not only the works in the original Sanscrit, but also the translations of them into modern Indian dialects, are executed in poetry. They have their verses arranged variously in feet, composed, like those of the Greek and Latin, of specific intermixtures of long and short syllables. Their rhyme is of the nature of alliteration, falling sometimes on the first letter or syllable of a line, sometimes on the second. The poetical expression errs in the extreme of loftiness, and is obscured by quaint phrases and perpetual allegories. Their descriptions are tediously long and minute, the likenesses being never drawn with a single stroke in the approved style of the ancient and modern classics of Europe. Their epic poems relate to the exploits of their gods and heroes, which are far more stupendous than any that we are accustomed to read with interest, being conformed to that extravagant taste in miracles which characterizes the genius of the Hindoo religion. One of the most interesting productions is the dramatic piece called Sacontala, which has been translated and read through all Europe, yet is characterized by a sufficient portion of Hindoo extravagance. The fables of Pilpai or Bidpai are by some thought to be the foundation of those of Esop and of Lokman.[b] Such fables may be considered as a very natural mode of writing among a people who believe that the souls of men pass into the bodies of animals. The epistolary style of the Brahmins is solemn and complimentary, beginning with the name of the writer and that of the person addressed, followed by a string of compliments, and concluding with business. No respects or compliments are ever sent to wives. Any thing of that kind would be considered ridiculous and rude. When notice of a death is communicated, the custom is to singe a little the point of the palm leaf on which the news is written. Though the different Indian dialects are closely akin, they are written in very different characters. They also differ in the form of their arithmetical ciphers, though they all follow the decimal series. The Telinga notation corresponds almost exactly with that which was communicated to Europe by the Arabs at the end of the tenth century, and which we now universally use for calculation. The Tamul notation rather resembles that of the Romans, consisting of letters of their own alphabet, and denoting ten, a hundred, and a thousand, by single letters. They have a paper made of the bark of a particular plant, (not of cotton, as has been supposed,) but they generally use the leaves of the latanier palm. Their writing, in the first instance, consists of mere scratching with an iron point, while the leaf is supported on the middle finger of the left hand. The right or writing hand is not moved along the leaf, as with us, but the leaf is from time to time pushed to the left with the iron point stuck in the letter last formed. In this manner the process is conducted with great facility, and a Hindoo is often seen writing as he walks along. The leaf is afterwards covered over with a black substance, which adheres to the written lines, and renders them more distinct.[c]

It is only in a very few mechanical arts that the Hindoos make any figure. Indulging in their natural indolence, they have scarcely any want but that of ease. Moderate and sober, a simple piece of linen or cotton stuff suffices them for clothing; their dwellings are the slightest and simplest that can be imagined;[d] their support consists of rice and water; little trouble is required to satisfy their few wants. Yet some rich individuals, habituated to the conveniences of life, display in their houses all the luxury of the east. We find the persons of the Rajahs and the Nabobs surrounded by numerous slaves; their garments glittering with gold, silver,

[a] The Seiks, as has been stated, p. 443, have a peculiar system of rites and doctrines, by which they are distinguished, as well as by their political organization. The Sauds are also a peculiar sect in Northern India. Their chief seats are Delhi, Agra, Jypoor, and Furruckabad. They hold an annual meeting in one of these cities, where they consult on their general interests. They resemble the Quakers in the simplicity of their dress, manners, and worship, their refusal to take an oath, their care of the poor, their industry, &c. They are pure Deists, and reject all idolatry. Their founder, Birbhan, a native of the province of Delhi, proclaimed his mission about 1640.—P

[b] "The fables of Pilpai or Bidpai appear to be the original of those of Lokman and Esop." M. B.—P.

[c] In 1826, there were six native newspapers in India; in 1819, only one.—Four of the six were in Bengalee; two in Persian. Of the Bengalee papers, one was published by the missionaries at Serampore two supported Hinduism; and one was liberal. A Hindee paper has been also established in Calcutta.—P.

[d] "A hut of bamboos covered with palm-leaves." M. B.—P.

and embroidery; their apartments adorned with painting and gilding, and perfumed with various valuable essences. Their wives participate in the taste of their husbands, and pass their lives in utter inactivity. The zenanas are the abodes of voluptuous repose, where pure water falls in cascades, or displays its refreshing surface in broad marble basins. The richest tapestry is used for covering their floors, adorning their walls, and lining their doors.[a] We find that in the time of Alexander, the Indian beauties made use of a rich profusion of pearls, diamonds, sapphires, and rubies.[b] Even to the nose and the feet were hung rings which tinkled at every motion, to which splendid embellishments was added the sweeter charm of thousands of natural flowers and odoriferous plants.[c] A variety of paints constituted, from a remote antiquity, a conspicuous article in Indian coquetry.

All classes of society among the Hindoos are in the habit of smoking tobacco and chewing betel,—acts as essential with them as eating and drinking. In all the houses of persons in good circumstances there are terraces or flat roofs, where a part of the day is spent in smoking. In travelling, they use different sorts of palanquins, which are often adorned in a most luxurious style, a mode of travelling well suited to a country where there are few roads practicable for carriages.[d]

The Hindoo character is a strange mixture of strength and weakness, of ferocity and of gentleness. This portion of the human race has, without passing through the various steps of a free civilization, been enslaved, refined, and degraded, by a political system which is both a theocracy and a despotism. Here the man who sacrifices life to the observance of an absurd law of caste, never has the daring to raise the arm of self-defence or of vengeance against the oppressors of his person and country. He gives all the extent of his protection to a sacred cow, but sees without emotion his nation consigned to be massacred. We have seen what an extreme degree of self-abasement, mortification, voluntary torture, and self-sacrifice, the spirit of religious system has generated in this singular race. Even the females are scarcely behind in the intrepidity with which they brave a voluntary death, in one of its most dreadful forms. Dressed in her gayest attire, the Indian widow walks forward triumphantly to the sound of music, to place herself on the flaming pile which consumes the dead body of her husband. A sacred joy sparkles in the eyes of her attending children, while they contemplate the heavenly happiness and never-ending glory to which their mother's self-devotion conducts her. "Will you not," says the European, "entreat your mother to preserve her life for the sake of the young offspring whom she renders helpless orphans?" "Nay," says the youth, "she must not so disgrace herself. Should my mother hesitate for a moment, I would encourage, I would urge her to the utmost, to complete the sacrifice which religion and honour demand."[e] It is not the dread of future punishment, but the hope of additional bliss, that forms the inspiring motive of such acts. But even when no sublime objects of either kind are presented to the mind, we have found some denominations among this strange people devoting their lives to a mere point of high moral principle and honour, or to an object of benevolence.[f] Their political feelings seem to be deadened by total despair, generating resignation and contentment. Perhaps it is only where they conceive the object which they aim at to be of certain attainment that they are capable of acting the hero; but in cases in which a risk of ultimate disappointment stares them in the face, they do not know how to muster courage for exertion. They are averse to that state of mind which implies turbulence, or even vigilance, though willing to surmount one obstacle, however much against their first feelings, or to submit to a train of passive sufferings, the nature of which is known and foreseen, and the ability to bear which is habitually cultivated. In one point of view, they furnish a conspicuous example of the plasticity of human nature, which admits of being moulded into a form so fantastic. In another, they exemplify the obstinacy of long habits, hereditary opinions, manners, and institutions, and the necessity of a very profound and well-directed policy for any political or philanthropic speculators who propose to govern them well, to meliorate their condition, or to improve their character. In this point of view, all the historical facts arising from their intercourse with other people, and the instances of success and of failure in all negotiations and projects of which they have been the objects, furnish interesting practical instruction.

Although the Hindoos might have carried on a splendid commerce by conveying to other nations the rich productions of their soil, they have always remained faithful to that law which forbids them to leave their native country. Hence other nations, with whom these productions were in demand, have been obliged to conduct the whole trade which the wealth of India offered. This circumstance has prevented the commerce of the Hindoos from reaching its due extent. Yet it has in every age existed in great activity. The Hindoos have been long acquainted with bills of exchange, and with the use of coin.[g] In all the Indian states, pieces of silver are coined into rupees,[h] which become the standard to which other coins are referred. "The rupee," says Legoux de Flaix, "may be considered as the Indostan crown, (ecu;) it has nearly the value of that piece, (about two shillings, or half-a-crown English.)[i] There are likewise gold rupees and gold pagodas, worth about eight or nine shillings[k] each. The lowest circulating medium consists of cowrie shells, of which fifty make a *poni*, ten ponis a *fanon*, and thirteen fanons a *pagoda*. Large sums are reckoned by the *lak*, which is a sum of 100,000 rupees, or 100,000 pagodas,—the one or the other being always specified when the term lak is employed. The European coins are also now current in that country, particularly the dollar,[l] the Louis, and the crown."

[a] Valentyn's Engraving of the Zenana of Nourmahal. See also a plate in Mr. Hodge's Travels, p. 24.
[b] Q. Curtius, VIII. ch. 9.
[c] Gita-Govinda, p. 357—359. Sacontala, p. 147. (German translation.)
[d] Solvyns, les Indous, Tome III.
[e] Bombay Courier, April, 1811.
[f] See p. 448 and 521 of this volume.
[g] Legoux de Flaix, Essai, l. I. p. 210.
[h] "The princes coin silver pieces, called rupees."—P.
[i] The ecu of exchange is 2s 6d sterling; but the French crown (ecu) is 5s sterling.—P.
[k] About 10 francs.
[l] "Piastre."

The products of Indian industry form a leading object of trade between India and Europe. The Indian stuffs, in a particular manner, are in request among the European nations, both for their durableness and beauty. Even in the days of Job we find that they had great celebrity.[a] In the language of trade, pieces of Indian stuff have received the name of guinea goods or guineas, (*guinées.*) It is in the north part of the Coromandel coast[b] that we find the most extensive manufactures of these articles.[c] The blue kinds are exported to Africa. The *perkals*, so called from a Tamul word signifying "superfine," are made in the Carnatic, of a long silky cotton, which is particularly abundant in the plain of Arcot.[d] There is another description of white goods, called salampoori, got from Ceylon, made of the cotton of Malcalama and the Carnatic. The district of Condaver furnishes the beautiful handkerchiefs of Masulipatam, the fine colours of which are partly obtained from a plant called *chage*, which grows on the banks of the Krishna, and on the coast of the Bay of Bengal.[e] The handkerchiefs of Paliamcotta,[f] more diversified in their designs as well as in their colours than those of Masulipatam, are exported in great quantities to America and Africa, where they are used for female dress. It is at Masulipatam, Madras, and St. Thomé, that the printed cottons or *chites*, improperly called Persian calicoes, are made. Their superiority has been ascribed to the good quality of the water in these particular places; but, since the Europeans have succeeded in imitating the Indian processes, the exportation has been considerably diminished. The long and broad webs covered with strange designs, and intended for bed-covers, are exported in great quantities to the Levant and the colonies. On the coast of Coromandel, a striped muslin is made, called *dorea*, and in the Tamul language *betille*, quantities of which are exported by the caravans to Persia, Arabia, and the Levant. Very little of it goes to Europe, where the fabric is skilfully imitated. The case is different with another stuff called *organdi*, which is made in the Carnatic, and much esteemed in Europe. The basins,[g] or basinets, come from the Northern Circars, and the ginghams from Madras, St. Thomé, and Paliamcotta.[h] The latter are no longer exported in considerable quantity, except to the other countries of Asia, where they are much used for clothing. Surat produces silks worked with gold and silver thread, which are sent to Persia, Thibet, and China, where they are preferred to those of Lyons for their lightness.[i] Cashmere furnishes its shawls and woollens. In the country of Dacca, the neusooks are made, a species of cotton stuff of great fineness and transparency. The Bengal cotton goods which go under the names of *casses*, *amâns*, and *garats*, have been exported in considerable quantity by the English; also the handkerchiefs called Burgoses and Steinkirks. It is, says M. Legoux de Flaix, by the combination and the happy mixtures of different kinds of cotton, adapted, by their strength, flexibility, and other qualities, to the fabric of different muslins, and by the experiments and observations of their ancestors, transmitted from father to son, that the Hindoos have brought the arts which depend on dexterity of hand to a degree of perfection from which we are still far removed. Much is also to be attributed to the physical constitution and the patient habits of the people. Though deficient in muscular energy, they have a delicacy, flexibility, and docility of hands, which enable them to succeed admirably in the finer sorts of manufactures, with looms and tools of a rude construction.

The English have greatly extended the plantations of indigo in Bengal. The best, however, is from Agra. It is exported to Europe, Persia, and Arabia. Through the exertions of the English East India Company, the production of cochineal has also been so much extended over the Coromandel coast, as to form at this time a branch of commerce. The sapan or red dye-wood is produced in great quantity in the eastern Ghauts, and is exported to Europe. Gum lac is furnished by several provinces of Indostan, especially Lahore, the Punjab, and Mooltan, where it is of the best quality. Legoux de Flaix states, that by the Ganges alone this article is exported to the amount of three millions of livres.[k] Sandal wood, which grows abundantly on the Ghauts and between the two ranges of these mountains, becomes an object of commerce in different forms; in blocks and planks for making small pieces of furniture; in powder for burning with incense; and in chips for dyeing. The Hindoos also extract from it a valuable essence, to which they ascribe salubrious virtues. At Mangalore, and several of the larger towns on the Malabar coast, there are extensive stores of sandal wood for exportation to Europe and different parts of Asia. China, in particular, consumes a great quantity of it. About 16,000 quintals are sent annually to China by the English Company.

Cotton is cultivated in almost every part of India. The finest grows in the light gravelly[l] soil of Guzerat, Bengal, Oude, and Agra. The cultivation of this plant is very lucrative, an acre[m] producing about nine quintals of cotton in the year.[n] The cotton of Guzerat is bought by the Chinese for the manufacture of nankeens. The English have paid great attention to the culture of silk, which is obtained from different provinces of India. The best is that of Cossimbazar, an island formed by the Ganges, as already described,[o] and which alone yields annually 2000 quintals. A great part of the silk of India is employed in the manufactures of the country; the remainder is exported to Europe, and to the ports of the Red Sea and the Persian Gulf. In the northern parts of Indostan there is a particular kind of worm, which produces a coarser and stronger silk than that of the common silk worm. Among the manufactures of Bengal is a kind of thin gauze, much employed for musquito curtains; these are thrown in one piece

[a] Job xxviii.
[b] "In the country of the Telingas."
[c] "Guinées."
[d] Legoux de Flaix, II. p. 24.
[e] Ibid. p. 53.
[f] "Paliacate." A town 8 leagues N. of Madras, remarkable for its muslins.—*Vosgien. Dict. Geog.*—P.
[g] Dinities.—P.
[h] Paliacate.
[i] Legoux de Flaix, II. p. 275.
[k] Ibid. II. p. 408.
[l] "Rocailleux."
[m] "Arpent."
[n] Legoux de Flaix, II. p. 175.
[o] See page 464 of this volume.

over the bed frames during the night, to exclude these troublesome insects, while they do not confine the air in the same manner as closer fabrics would do.

The Malabar coast derives a large income from the culture of pepper, which is exported to the extent of 120,000 quintals in the year. The principal pepper marts are Calicut, Mahé, Mangalore, Cochin, and other towns on that coast. Another aromatic, cardamom, which grows with much luxuriance in the western Ghauts, is bought in great quantities by the Persians, the Arabs, the Chinese, the Japanese, and other Asiatics, who make much use of it for giving a higher zest to their betel. The Company enjoys an exclusive monopoly in the trade of opium, the finest of which comes from the province of Bahar. The same is nearly the case with saltpetre, in which India abounds, and of which the district of Patna alone yields more than 600,000 quintals annually. The sharks on the coast of Malabar are, like those of the Maldives already mentioned, fished for the sake of the fins for the Chinese market.[a] These exports to foreign countries are productive of an immense influx of money to India.

At present the import trade is entirely in the hands of the English, consisting of cloths, velvet, iron, copper, lead, fire arms, wine, spirits, lace, gold embroidery, coral, and fruit dried and preserved. From Ceylon there is an importation of palm wood, areca nuts, and cinnamon; of spices from the Molucca islands; teak wood from Pegu; coffee, incense, corals, and dates from Arabia. The European vessels bring a large quantity of tea from China. The coast of Africa sends cargoes of shells, which are in great request among the Hindoos as an article of ornamental dress.[b]

Recently the Indian trade has become a subject of considerable interest in Great Britain, particularly in relation to the exclusive privileges enjoyed by the East India Company, to the prejudice of other British merchants. It has been particularly complained that the latter were prohibited from engaging in certain branches of trade which were freely allowed to the vessels of America and other nations, such as the liberty of conducting the trade between India and other nations not English. It appears altogether incredible that so unmeaning a sacrifice of national profit should ever have been made, a sacrifice more senseless than the self-immolations of the Hindoos, because they are without any assignable motive. In the last renewal of the charter given to the Company by government, the privileges of British subjects have been considerably extended. This object was the more easily effected, as the trade was found to yield little or no profit to the Company. Indeed, the China trade was the only source of their commercial profit. Here, therefore, the monopoly has been continued. It has, by some, been considered as conducive to a more orderly and safe intercourse between two nations so different from one another in their manners and ideas as the English and the Chinese, and so liable to fall into serious disputes arising from the imprudence or ignorance of individuals, more especially when the latter are not under due responsibility and control. Commerce, however, is always conducted in a much more expensive manner by such a Company than by private adventurers, and branches of trade which are a losing concern to the former are sufficiently lucrative to the latter. Hence, since the year 1815, the trade between Great Britain and India has been materially improved, and the cotton manufactures of England have been introduced into Asia to an extent which was not anticipated. The results of these modern changes of arrangement have been such as to generate a strong sentiment in England in favour of a still freer system of trade, by the removal of many or most of the restrictions which now exist. Much information has been laid before the public by the parliamentary inquiries which this question has elicited. The Report from the House of Lords, laid before the Commons, of date May 7, 1821, contains an ample collection of facts, which bear chiefly on the trade with China, but also touch on that of Indostan. Extensive details and discussions on this subject are foreign to our work; but we shall give an extract from some of the tables of that report, which will serve to show the extent as well as the nature of the commercial intercourse of Europe with India.

The first table which we copy blends the trade of China and India together, and gives chiefly a comparison between the proportion of the trade which was in the hands of the Company and of free traders, the latter including those who had privileges or licenses from the Company for those branches over which they possessed a control, as well as those which were thrown open to the public.

Value of Imports from India and China into Great Britain, during the following years.

		£
1814.	By the Company,	7,227,663
	Free and privileged trade,	4,061,892
	Total,	£11,289,555
1815.	By the Company,	7,154,130
	Free and privileged trade,	5,769,459
	Total,	£12,923,589
1816.	By the Company,	7,855,312
	Free and privileged trade,	5,703,912
	Total,	£13,559,224
1817.	By the Company,	7,361,862
	Free and privileged trade,	5,097,748
	Total,	£12,459,550
1818.	By the Company,	5,192,804
	Free and privileged trade,	7,098,650
	Total,	£12,291,454
1819.	By the Company,	5,792,406
	Free and privileged trade,	6,297,510
	Total,	£12,089,916

Exports to India and China.

1814.	By the Company,	1,732,720
	Free and privileged trade,	870,177
	Total,	£2,602,897
1815.	By the Company,	1,753,302
	Free and privileged trade,	1,454,728
	Total,	£3,208,030
1816.	By the Company,	1,539,130
	Free and privileged trade,	1,868,396
	Total,	£3,407,526

[a] See page 512.

[b] For a more detailed view of this subject see the work entitled "Manuel du Commerce de l'Inde, par M Blancard, negociant de Marseille."

		£
1817.	By the Company,	1,313,494
	Free and privileged trade,	2,708,024
	Total,	£4,021,518
1818.	By the Company,	1,250,064
	Free and privileged trade,	3,052,741
	Total,	£4,302,805
1819.	By the Company,	1,358,327
	Free and privileged trade,	1,650,338
	Total,	£3,008,665

In this table we find the imports to Great Britain far exceeding the exports. This seems chiefly to arise from those remittances which, independently of an exchange of commodities, constitute an essential part of the wealth of Great Britain, forming an income which is spent in the country, promoting its internal trade, and swelling the national revenue. It is here that we see one of the leading causes of the opulence of that nation, and of the credit of her government. This is saved to the country after much has been squandered by the servants, civil and military, during their residence in India. Its operation has no connexion with the question of profit or loss on the part of the East India Company,—a question too often confounded with that of the influence of the colonial possessions on the pecuniary interests of the nation and government.

The kind of intercourse which India maintains with the mother country will be exhibited in the following tabular view of the particular articles of import and export for the year 1819, those of which the Company was the medium, and those which were carried by free traders being included in one number.

Imports from India and China to Great Britain, for the year 1819.

	Value.
Borax,	£23,887
Camphor,	15,022
Cassia-lignea,	25,352
Cinnamon,	127,479
Cloves,	637
Coffee,	193,547
Cotton Wool,	2,452,344
Gum-lac,	56,365
Indigo,	1,106,715
Mace,	22,810
Mother-of-pearl shells,	13,176
Nutmegs,	145,489
Pepper,	198,745
Piece goods,	978,687
Rhubarb,	16,905
Rice,	374,954
Sago,	21,095
Saltpetre,	446,713
Raw silk of Bengal,	953,817
Ditto of China,	197,855
Sugar,	431,605
Tea,	3,859,442
Turmeric,	13,705
Other articles,	413,570
Total,	£12,089,916

Exports from Great Britain to India and China, during the year 1819.

	Value.
Apothecary ware,	£23,768
Apparel,	30,811
Beer and ale,	40,398
Printed books,	40,844
Brass,	5,813
Carry forward,	£141,034

Brought forward,	£141,034
Cabinet and upholstery wares,	6,998
Carriages,	12,859
Coals,	1,124
Cochineal,	13,722
Colours for painters,	13,661
Copper in bricks and pigs,	231,951
—— in sheets and nails,	58,289
—— wrought,	39,985
Cordage,	5,827
Cotton manufactures,	461,367
Cotton twist and yarn,	138
Earthen-ware,	10,577
Glass,	77,145
Guns and pistols,	25,541
Haberdashery,	15,895
Hardwares,	29,601
Hats,	13,543
Iron in bars,	88,892
—— bolt and rod,	5,182
—— cast and wrought,	41,214
Lace and thread of gold and silver,	7,514
Lead and shot,	60,668
Leather and saddlery,	30,510
Linen manufactures,	22,275
Military stores,	20,951
Musical instruments,	14,220
Ordnance of brass and iron,	33,766
Plate, plated ware, jewellery, and watches,	46,353
Provisions,	40,658
Quicksilver,	93,614
Silk manufactures,	6,251
Soap and candles,	5,676
Spirits, British,	1,406
—— Foreign,	51,634
Stationary,	31,757
Steel, unwrought,	20,508
Sugar, refined,	975
Swords,	939
Tin unwrought,	47
Tin and pewter wares,	7,198
Wines,	49,450
Woollen manufactures,	938,100
All other articles,	229,710
Total,	£3,008,665

From the most cursory inspection of this last table, it will appear that a great proportion of the goods carried from Europe to India are for the consumption of the Europeans resident in that country.

The small quantity of Tin included in this list is sent by the Company. Tin abounds so much in India, and more especially in China, that it cannot be exported from this country except at a loss, and the Company sends it out only in compliance with a very absurd article in their charter.

Since trade has received additional activity by the removal of some restrictions, the sale of British woollens has been greatly increased. The cotton manufactures of England are the only articles altogether new that have found a sale among the natives.

The political vicissitudes to which Indostan has been subjected, are of a kind peculiar to that country. Among persons who have taken a cursory and partial view of modern events, it has been a common mistake to represent its native inhabitants as the most peaceful people in the world, becoming the unfortunate prey of rapacious foreign conquerors. In so far as regards their dispositions towards other countries, the Hindoos certainly have never shown any disposition to give the slightest molestation. It is with them a principle of religion not to travel beyond the sacred territory which has given them birth, and in which alone opportunities are afforded for continuing the observances of their fa-

thers, many of which have local references. But, when it is supposed that among themselves the Hindoos originally enjoyed peace and happiness, under native governments characterized by patriotic feelings, and watching with paternal solicitude over their interests, we shall find such pictures to be mere gratuitous assumptions, as soon as we endeavour to trace any particulars of the Hindoo history and character. The attacks and spoliations committed by others have been sufficiently barbarous; but they are not chargeable with the destruction of a native golden age. The only difference on the fate of this people has been, that they have been oppressed and plundered by strangers instead of their own countrymen.—Although the political and religious fabric of Brahminism has, from an antiquity more remote than history can trace, extended over Indostan, yet we have no evidence of that country, or even any large division of it, having been united under one political sovereign. The history of the emperor Vicramaditya is too ridiculous to be allowed the least historical credit, and must be consigned to the department of mythology.[a] All the monuments that can be admitted as throwing light on the early state of that country represent it as divided into numerous small principalities which were habitually at war with one another, and subjected to an internal government which combined the harshness of the savage character with the systematic oppression of an ill directed refinement, allowing no play to the freedom of action, and no opportunities for industry to improve the means of comfort or enjoyment. Revolutions were frequent, and their contests conducted with unsparing cruelty. Some of the most important documents found in that country are the inscriptions declaratory of grants of land made by Hindoo princes. In these the princes are always described as successful warriors, surrounded by enemies over whom they had triumphed. In the inscription found at Tanna, part of the panegyric of the donor prince runs thus: "Having raised up his slaughtered foe on his sharp sword, he so afflicted the women in the hostile palaces, that their fore-locks fell disordered, their garlands of bright flowers dropped from their necks on the vases of their breasts, and the black lustre of their eyes disappeared: a warrior, the plant of whose fame grows up over the temple of Brahma's egg, (the universe,) from the repeated watering of it with the drops that fell from the eyes of the wives of his slaughtered foe." Such are the traits of the rulers who flourished in Indostan, and such the subjects of panegyric and the ideas of merit and honour, which prevailed. The penal laws were cruel and partial in the extreme, and the practical conduct of the petty despotisms was in every thing the reverse of mild. "A thunderbolt," says the author of the Hetapodesa, "and the power of kings are both dreadful, but the former expendeth its fury at once, while the latter is constantly falling on our heads." "The conduct of princes," says the same work, "like a fine harlot, is of many colours; true and false; harsh and gentle; cruel and merciful; niggardly and generous; extravagant of expense and insatiably solicitous of the influx of treasure." "A man of good principles is hard to be found in a country governed for the most part by the rod. Princes, alas, in general, turn away their faces from a man of good qualities."[b]

It appears from ancient historians that Indostan has always been subject to incursions and devastations in the direction of western Tartary and the Paropamisan mountains. One of the most valuable of the satrapies of Darius Hystaspes was in India. The conquests of Alexander did not extend quite so far as the previous possessions of that monarch. Part of India, as far as the mouth of the river Indus, was included at one time in the kingdom of Bactria, possessed by the Grecian successors of Alexander.

More sweeping conquests were afterwards made by the Mahometans from Afghânistan, and by Tamerlane and his successors. These began thirteen centuries after the death of Alexander. In the year 1000 of the common era, Mahmood of Ghiznee[c] subdued the greater part of Indostan, exercised the greatest cruelty on the nation, and did what he could to abolish all former systems of government. Death prevented this savage warrior from adding southern India to his conquests. Kuttub, one of his generals, founded the Afghân (called by the Hindoos the Patan) dynasty. In 1398, Tamerlane overran India, and in five months acquired in that region the epithet of "the Destroyer." The Mongols whom he commanded pillaged Delhi, committed every where the greatest cruelties, and carried off an immense booty. In 1526, they returned under Tamerlane's descendant Bauber, overthrew the Patan throne, and made Bauber emperor at Delhi. During these tremendous invasions, several Indian tribes of the warlike caste retired to the mountains, where they formed independent states of greater strength than the former kingdoms of India, and better qualified, as well as better situated, for maintaining their independence. Some of these have become, in modern times, formidable conquerors, under the designation of Mahrattas, Seiks, Ghoorkas, and other independent states. Bauber was the first Indian sovereign who received, in Europe, the title of the Great Mogul. Humayoon,[d] his son and successor, had an active and warlike, but very troubled reign. He was deprived of his kingdom, which fell into the possession of Ferid, the Patan. This prince paid some attention to the prosperity of his kingdom, by forming great roads between Bengal and the Indus, bordered by fruit trees, and furnished with posts and caravanseras for travellers. On his death, the king of Persia placed Humayoon again on the throne. He was succeeded by his son Akber, a prince renowned for valour, wisdom, and justice. He subdued Bengal, extended his empire both to the north and to the south, and divided it into twelve provinces, or *soobabies*, each of which was subdivided into districts or *circars*, comprehending a certain number of cantons or *pergunnahs*. The history of Akber, written by his vizier Abul Fazel, describes the divisions, the population, industry, revenues, and topography of this emperor's possessions. The work is known under the title of Ayen Akbery, or "The Mirror of Akber." Arrived

[a] See Mill's History of British India, Book II. Chap. 10. Also Capt. Wilford's Essay on Vicramaditya and Salivahana, in the 9th vol. of the Asiatic Researches, p. 158.

[b] Wilkins's Hetapodesa, p. 161. 82. 160. 166.

[c] Of Ghazna or the Gaznavide.

[d] Houmaioun.

at the summit of its splendour, the kingdom was thrown into confusion by Aurengzebe, the grandson of Akber, who, after deposing his father, took violent posesssion of the throne, and oppressed the nation by all sorts of vexations. He is said to have drawn from the rent of cultivated land a revenue of 900 millions of francs, and to have kept up an army of a million of men. Aurengzebe is in a great measure the author of the modern political constitution of Indostan. He placed at the head of each province a Soobah, or lieutenant, under the name of *nabob*,[a] to whom were consigned the command of the troops, and the disposal of civil employments. Each nabob possessed in a different province a portion of land from which he drew his own maintenance, and was thus deprived of the means of harassing the province in which he commanded. Several provinces contained principalities governed by their own rajahs, who paid tribute, and furnished troops to the emperor. The circars were governed by zemindars, a sort of feudatory nobles, who acted as judges, and collectors of the revenue. Aurengzebe was obliged to make war on the Mahrattas, and in the end paid them a fourth part of his revenues. The Seiks also made incursions into his territories, but were repelled. Aurengzebe died in 1707, at the age of 90. Under his reign, the Mogul empire extended from the 10th to the 35th degree of latitude, and included a population of more than sixty-four millions.

The successors of Aurengzebe, too weak to defend so vast an empire against the warlike nations by which it was surrounded, saw it, in the space of fifty years, reduced by unsuccessful wars to a most deplorable condition. Nadir Shah of Persia made an incursion, in which he carried off, with little trouble, immense treasures from Delhi, though he afterwards lost one half[b] of it in recrossing the desert. The Afghâns having obtained possession of a part of this booty, now disputed the empire of India with the Mahrattas. In 1761, 150,000 Mahometans under Abdala king of the Afghâns, were victorious in the famous battle near Delhi, in which they were opposed by 200,000 Mahrattas.[c] But the prospects thus afforded them were not followed up with sufficient zeal, and the empire, broken down into a plurality of governments under nabobs who set up for independence, was undermined by another race of invaders, who from Europe visited India, actuated by national ambition and commercial enterprise; accompanied in some instances, with an ardent spirit of religious proselytism.

An extensive commerce between India and the countries of the Mediterranean had been, by different routes, maintained from remote times. The Romans established a communication by the way of Egypt, which was destroyed by the conquests of the Saracens; but restored again by the Mamelukes, and conducted by the Venetians.

At length the Portuguese, under Vasco de Gama, having discovered the passage by the Cape of Good Hope, landed at Calicut in 1498, and, after acquiring considerable influence by their political intrigues among the native princes, took possession of Goa, under Albuquerque, in 1508, and enjoyed a lucrative trade, as well as great power, in various parts of India, though weakened by internal jealousies and discords, till supplanted by the Dutch. The latter began their commercial enterprises in 1594, and in 1660, and 1663, after having deprived the Portuguese of their establishments in Malacca and Ceylon, they drove them from the most of their possessions on the coast of Malabar, and obtained establishments of factories for themselves on the Coromandel coast.

The French, after some unsuccessful attempts on Surat and Trincomalee, took St. Thomé, near Madras, in 1672, which was afterwards taken from them by the native king of Golconda, aided by the Dutch; and the French settlement at Pondicherry was formed of the wreck of that prior establishment. In 1720, a small Austrian fleet from Ostend, appeared off the coast of Malabar, but the interference of that power was discontinued by agreement. The Danes without engaging in measures of hostility with any power, European or native, obtained liberty from the Rajah of Tanjore, to form a settlement at Tranquebar.

England, however, has proved much more successful in acquiring an ascendency in this part of the world than any other power.

It was in the reign of Elizabeth, about the year 1600, after the favourable accounts of India brought home by Sir Francis Drake, that the English first engaged in mercantile enterprises in this direction. They obtained establishments of factories at different places in succession; at Surat, in 1612; at Madras, in 1653; and on the Hoogly, in Bengal, in 1645. In 1688 the strong island of Bombay, which Charles II. had received when he married the Infanta of Portugal, was given to the East India Company. In 1690 they obtained a settlement at Fort St. David, near Madras. Fort William was built in 1700. The different factories contained valuable stores, which always furnished ready cargoes for the ships. The native governments being sometimes insecure in themselves, or unable to give the English factories the necessary protection, the latter were strongly fortified and garrisoned with their own soldiers. These defensive arrangements became the rudiments of their future power.

About the year 1744, the English power in India obtained a decided ascendency over that of the other European nations; and in the first instance, no rapacity or injustice could exceed those which were practised by the servants of that Company, particularly in Bengal, where they insisted on engrossing the whole internal trade of the country; deposed one nabob, and established another different times in succession; securing at each revolution an aggrandizement of their own possessions, together with a boon of ready treasure. For raising the latter, the Mahometan rulers were obliged to oppress the people to the utmost, and after all, were deposed for not fulfilling engagements which were really impracticable. The Company at home sometimes remonstrated against these, and other nefarious practices; and, sometimes aimed at a more decent and moderate manner of conducting them; but the avarice of

[a] Nawab.

[b] "One fourth."

[c] This battle was fought on the plains of Paniput, 17 leagues N. W of Delhi. (*Vosgien.*)—P.

their servants on that distant station, which removed them in a great measure from immediate control, and rendered ultimate responsibility a matter both tedious and difficult, so far prevailed as to stifle the voice of justice and humanity. In 1765 the political subjugation of Bengal to the direct power of the English was completed, and Lord Clive assumed the supreme command in India. The servants of the Company now enriched themselves, while the Company was reduced to poverty and difficulty. The Company, in order to realize their views of profit, took into their own hands the collection of the revenue from the land, a measure which, by subverting all former arrangements in property, was followed by a wide spread scene of defalcation, oppression, and misery. The ruin of the fertile but unfortunate Bengal was completed by a famine in 1770 and 1771, arising not from a monopoly in rice as has been asserted, but from a failure of two successive crops, by which about one third of the inhabitants perished. Yet the revenue was violently kept up to its former standard. In other parts of India the British power continued to extend. In 1765 the Circars were given up to that nation. In 1769 Hyder Ali was defeated. In 1774 the British conquered Rohilcund. In 1778 they took some of the finest parts of Guzerat and the Concan from the Mahrattas. They were, in 1780, involved in another war with Hyder Ali, which terminated in 1784 in the conclusion of peace with his successor Tippoo.

The following is a table of the political divisions of Indostan, as they existed in 1784.

A.—British possessions.
1. The whole soobah of Bengal in full sovereignty.
2. The greater part of Bahar.
3. The district of Benares.
4. The district of Midnapore in Orissa.
5. Four of the five northern Circars.
6. The Jaghire in the Carnatic, with a little additional territory.
7. The islands of Bombay and Salsette.
8. The Doab between the Jumna and Ganges, extending to within forty miles of Delhi, taken from the Nabob of Oude.

B.—Belonging to the Seiks.
1. The province of Lahore.
2. The principal part of Mooltan.
3. The western part of Delhi.

C.—To the Mahrattas.
1. The State of Poonah, called the western Mahratta State.
2. That of Berar, or the eastern State.

These two included the territory lying between the confines of Agra and the river Krishna, and great part of Adjimere.

D.—To the Nizam.
1. Golconda.
2. The principal part of Dowletabad.
3. The western part of Berar.
4. Guntoor, one of the northern Circars.

E.—To the Nabob of the Carnatic, Mahomet Ali.
The whole country lying between the Circar of Guntoor and Cape Comorin.

F.—To Tippoo Sultan.
1. Mysore.
2. Bednore.
3. Coimbatoor.
4. Canara.
5. Dindigul.
6. Some countries in the north, conquered by Hyder.

The district of Rampoor, at the foot of the northern mountains, was held by a Rohilla chief. Some of the Rajepoot states enjoyed a precarious and feeble independence, subjected to perpetual insults from the Mahrattas; and the northern mountains continued in the possession of obscure independent sovereigns, who took no part in the political disturbances of Indostan.

The evident contrast between this table and the present political state of this extensive country, as it has been unfolded in the preceding pages, renders it unnecessary to detail the particular political and military transactions, by means of which the British power in India has been extended, and secured against the different interests which had been opposed to it. Nor would it suit our work to delineate the characters, or appreciate the conduct, of those governors and military leaders, to whom the affairs of India have been committed.

Their general policy has been already sufficiently apparent. The jealousies of the political parties have been turned to account by them for effecting gradual encroachments. These have, in the course of time, lost much of their character of violence. An appearance of moderation has been kept up, sometimes founded in principle, and sometimes in the dictates of a cautious system of aggrandizement. Offers made by princes to subject themselves and their country to the English, have been refused. In many cases the acceptance of such offers would have embroiled them in disputes with other petty states, to the disturbance of their present rule, and the injury of their future prospects. It is also true that the dread of possessing too extended an empire, one which, to use a common place phrase of little meaning, would fall to pieces by its own weight, has had some influence, especially with the East India Company; but this dread has yielded to circumstances apparently imposing on them the imperious necessity of taking the reins into their own hands, sometimes in order to avoid perpetual molestation from a turbulent neighbour, sometimes to give order to a territory which otherwise was a certain prey to a wretched anarchy, and sometimes to terminate scenes of wanton inhumanity which would have otherwise been perpetuated. These, and other necessities, have often been perceived and acted on by the servants of the Company in India, who have taken on themselves more responsibility than was allowed them.

Different princes who have submitted to the English from necessity, have still sighed for independent rule, have cherished against their masters all sorts of hostile designs, have broken their pledged faith, and raised the arm of ineffectual opposition, after repeated forgiveness of their former treacheries.

The fate of the native and Mahometan rulers has excited the sympathy of many Europeans, whose feelings are chiefly reserved for persons of rank and power, while the lot of the mass of the population has met with less consideration. With those who cherish extended philanthropy the present preponderance of Great Britain in India will not be a matter of regret. Principles of humanity, moderation, and justice, to the benefits of which the Hindoos had from time immemorial been strangers, are thus introduced among them in full operation.

The proceedings of all who are concerned are, at this moment, brought more and more into the view of an impartial European public, and a great desire is every where manifested to render the existing influence

as beneficial as possible to all classes of the numerous inhabitants of India. In the internal arrangements much improvement has been attempted. The land which, in that country, had always been considered as the property of the government, has been given to the natives as their permanent property. The zemindars, who, though persons of rank in the country, had formerly been merely hereditary collectors of the land-tax, are made the landholders, and the ryots, or cultivators, dependent on them, in the same manner as the farmers in Great Britain. It must be acknowledged, however, that in many cases the privileges of the ryots are by this arrangement abridged; and the zemindars, not having acquired the proper feelings of landholders, have acted the part of avaricious extortioners towards their tenantry. In other cases this natural aristocracy has made use of the power which was given them, to sell their estates, which have in the transfer been parcelled out among small proprietors. In some districts the partition of the inheritances among a numerous family has co-operated with the cause now mentioned, to extinguish the order of landed gentry.

The establishment of an efficient police, and the administration of civil and criminal justice, have been made objects of solicitous attention. These objects have presented great difficulties, and the discussions to which they have given birth have been greatly extended.[a] In the government of Bengal the Mahometan system of law has been adopted, because it had already been established in the practice of the courts under the government to which the English Company succeeded. The business of the courts, however, is burdensome in the extreme, from the inordinate propensity to civil litigation which exists among the natives, as well as other causes now to be mentioned as applicable to the Indian empire at large. The expense of the judicial establishments is enormous, and the Directors of the East India Company do not think that they have cause to be satisfied with the arrangements which are made by the colonial authorities.[b] In the governments of Bombay and Madras, Hindoos and Mahometans are respectively tried by their own laws, both in civil and criminal cases. This is found necessary to secure their confidence.[c] For this reason an apparent partiality is exercised in favour of the Brahmins, when any one of that caste is convicted of a capital crime. He is not subjected to capital punishment, and he is exempted from the punishment of hard labour. He has been sometimes merely banished to a distant part of India, and thus dangerous characters have been let loose on society. On this account the punishments now most approved are either solitary and perpetual imprisonment, or transportation beyond the boundaries of India. The influence of this last is conceived to be quite equal to that of capital execution, while it is much less revolting to the feelings of the well-disposed.[d] The selection of fit persons for the judicial office is another important problem. European judges are free from the motives to partiality which operate among many of the natives; and for this reason, as well as their superior character, their decisions are in many places regarded with particular respect and confidence.[e] But, labouring under a want of practical knowledge of the Hindoo character, they are disqualified, in many cases, for appreciating the value of evidence. They are liable to be imposed on by the falsehoods of witnesses, and they are apt to impute cunning to persons who are merely simple and awkward. Sir H. Strachey, judge and magistrate of Midnapore, in his Report for January, 1802, says, "We perhaps judge too much by rule. We imagine things to be incredible because they have not before fallen within our experience. We constantly mistake extreme simplicity for cunning. We make not sufficient allowance for the loose, vague, and inaccurate mode in which the natives tell a story; for their not comprehending us, and our not comprehending them. We hurry, terrify, and confound them, with our eagerness and impatience."

For these and other reasons, some give the preference to the decisions of heads of villages, or other persons whom the natives are accustomed to respect. Lieut. Wilks,[f] Col. Munro, Col. Read, and others who enjoyed the advantage of practical experience in the Mysore country, recommend the administration of justice through the village *potails*, (or chiefs,) and the *punchaits* (juries of five.)[g] Col. Munro says, that a native who has a good cause applies for a punchait, while he who has a bad one seeks the decision of an English collector or judge, whom he knows it is so much easier to deceive. This, however, does not apply to the Bombay presidency, where these institutions had gone into disuse, and the natives in those ranks of life had, by unfavourable events, become demoralized and ignorant.[h] The punchaits are said also to found their decisions on considerations different from the real merits of the case. With the best evidence before them, they seldom award the whole of the amount claimed by the party, and rarely dismiss the most ill-founded demand without awarding a certain sum, determined by their opinion of the defendant's wealth, and other considerations still more foreign to substantial justice. A third expedient is the appointment of native commissioners by the government to the functions of judges. In some places this measure meets with praise;[i] in others it is condemned, on account of the want of respectability of the individuals who are willing to undertake such a set of duties for the small salaries allowed them.[k] Delays of justice, arising from the accumulation of cases[l] and the latitude of appeal,[m] have also been felt, and called forth proposals for reform, such as the substitution of oral instead of written pleadings; a limitation of the right of appeal; and the restriction of the

[a] See Papers relating to Police, and Administration of Justice, under the governments of Bengal, Fort St. George, and Bombay, from 1810 to 1819. Printed by order of the House of Commons.

[b] See a Letter from the Court of Directors to the Governor-General in Council, 19th Feb. 1819, among the above Papers, p. 283.

[c] Observations of Mr. Dunlop. Papers, p. 343.

[d] Judicial Letter from Bombay. Ibid. p. 346. Case of Roop Sunker, who was imprisoned for life, and another Brahmin, guilty of administering poison, who was transported to Prince of Wales' Island for life. Ibid. p. 321.

[e] Ibid. p. 325. 328.

[f] Historical Sketches of the South of India.

[g] Papers, &c. p. 289.

[h] Ibid. p. 327.

[i] Ibid. p. 327.

[k] Ibid. p. 297

[l] Ibid. p. 299.

[m] Ibid. p. 294, 301.

higher courts to causes of a certain magnitude.[a] It is to be regretted, however, that among the means of simplifying the functions of courts, recourse has been had to the imposition of stamp duties on law proceedings, and thus, by throwing an obstacle of greater expense in the way, refusing justice and protection to a certain number of individuals who are as well entitled to these blessings as their neighbours. With all these deductions, however, much has undoubtedly been done, as has already appeared in some of our topographical sketches, particularly for the prevention of crime. One of the obstacles which stood in the way of that object was the practice followed by powerful depredators, of intimidating persons from giving evidence. It is not to be supposed that the progress of improvement in these particulars has yet reached its limit.

While the prejudices of the people are in general respected, some criminal practices, founded on hereditary delusions, are resisted. The murder of female infants, among the Rajepoots and some others, is prohibited, and the burning of widows every where discouraged. A length of time, however, will be requisite to bring these and other savage practices into universal disrepute.

Attempts are made to introduce among the natives the principles of Christianity. None of the violence which characterized the Romish missionaries is practised by the English clergy, or even by the more zealous methodists. Some of the latter, while endeavouring to promote their cause by reviling the character of Mahomet, have been prohibited by the government from following a method of address which tended so much to excite displeasure in the Mahometan part of the population. There is no reason to apprehend that prudent efforts to disseminate the truth can be more dangerous in the hands of the present predominant race than they proved in those of the Dutch nation in the island of Ceylon.

An English author who was in India during the latest great political changes which were effected, expresses a hope for futurity, which every well-disposed person must wish to entertain. "Perhaps, in some future age, when the genius of Britain shall no longer lord it over the prostrate realms of Asia, this germ of liberal institutions of internal polity may be referred to as the commencement of a happier era in these ample regions,—as the first lesson of self-government which Europeans shall have taught to the now slavish minds of the Hindoo race, and which may have afterwards led to the gradual diffusion of political liberty and moral improvement."[b]

Many causes of instability have been pointed out by politicians in the tenure by which the British nation holds the empire of India. The extensive population of that anomalous empire; its great distance from the country of the ruling nation; the small number of English resident in India; the wide difference of religion, manners, and mode of life; the contempt and odium in which, on these accounts, the persons of the rulers are held; the disappointment of those natives whose power in the land of their fathers is diminished or threatened; the dread of future attempts to thwart their opinions, and subvert their institutions; the opposition of interests and inclination which is liable to occur between the British who are resident in India, and their government at home; the increase of the number of persons of a mixed European and Indian breed, who are kept in a subordinate rank, but disposed to claim political rights which they do not enjoy, and whose manners are considered by the proud and timid part of the English as offensively arrogant;—to these, and many other internal sources of insecurity, has been added the chance of invasion from surrounding nations, whether as already organized, or as they may become hereafter united under energetic leaders, to show that the present state of things must be of short duration. Any opposition arising from a patriotic spirit among a people so contracted in their sentiments, and so slavish in all their political feelings as the Hindoos, is the least likely of all the conceivable sources of future revolutions. The sepoys, or native troops in the service of England, participating in the universal political apathy, are always ready to serve with exclusive fidelity the power which pays them most liberally and most punctually. Their deeply-rooted prejudices, however, require to be scrupulously respected. Serious mutinies have arisen from instances of imprudence in this particular, which were allayed as soon as satisfactory pledges of this necessary respect were given to them.

One part of the policy of England has hitherto been, to prevent the springing up of a numerous race of their own descendants as colonial settlers. Hence, though there is much unoccupied territory, no native European is permitted to establish himself as a landholder. All the English consequently are mere sojourners, most of them bound to their native country by early recollections, and the hopes of revisiting it after acquiring a fortune. The pleasure of finding in the eastern world another England, as those do who emigrate to America, who find that country in most particulars presenting the same social comforts and habits to which they have been early bred, and separated only by its political independence, this pleasure is never granted to the Englishman in India. He goes not to live among a race of friends, but in a nation of inferiors and slaves. Whether this policy is wise, or the reverse; whether it should be pronounced contracted or liberal; whether this, or an opposite course, would be productive of greatest advantage to the human race, and of the most agreeable terms of future intercourse in the event of India being by any means politically detached from England, these are questions merely fitted to occupy the speculative politician in his closet, and perhaps not necessarily involved in the great objects of an ultimate diffusion of intelligence and of happiness over India.

[a] Papers, &c. p. 340.

[b] Prinsep's Narrative of the Political and Military Transactions of British India, under the Administration of the Marquis of Hastings, from 1813 to 1818, p. 436.

The following statements exhibit the revenues and charges of British India, as given in the report of 1826.

	1823.	1824.	1825.
Net Revenue,	£5,732,023	£3,266,280	£2,539,482
Net Charges,	1,140,342	1,576,657	1,857,986
Surplus Revenue,	4,591,681	1,689,623	681,496
Interest on Debts,	1,649,383	1,602,649	
Net surplus Revenue,	2,942,298	86,974	

Debts of the East India Company, April 30, 1824, *in India.*

On Interest,	£26,465,793
Not on Interest,	8,113,186
	34,578,799

Home Account, May 1, 1826.

Total Debts,	£15,662,810
Assets	23,932,578
Balance,	£8,269,768

As. Journal.—P.

Table of the Area and Population of the Modern States of Indostan for 1820.

	British Sq. Miles.	Population.
British Territory.		
Bengal, Bahar, and Benares	162,000	39,000,000
Additions in Indostan since A. D. 1765	148,000	18,000,000
Gurwal, Kumaoon, and the tract between the Sutledge and Jumna	18,000	500,000
Total under the Bengal Presidency	328,000	57,500,000
Madras Presidency	154,000	15,000,000
Bombay Presidency	11,000	2,500,000
Territories in the Deccan, &c. acquired since 1815, and not yet attached to any Presidency	60,000	8,000,000
Total British territory	553,000	83,000,000
British Allies and Tributaries.		
The Nizam	96,000	10,000,000
The Nagpoor Raja	70,000	3,000,000
The King of Oude	20,000	3,000,000
The Guicowar	18,000	2,000,000
Kotah, 6500—Boondee, 2500—Bopaul, 5000	14,000	1,500,000
The Mysore Raja	27,000	3,000,000
The Satarah Raja	14,000	1,500,000
Travancore, 6000—Cochin, 2000	8,000	1,000,000
Under the Rajas of Joodpoor, Jeypoor, Odeypoor, Bicanere, Jesselmere, and other Rajepoot chiefs; Holcar, Ameer Khan, the Row of Cutch, and numerous other petty native chiefs; Seiks, Gonds, Bheels, Coolies, and Catties, all comprehended within the line of British protection	283,000	15,000,000
Total British and their Allies	1,103,000	123,000,000
Independent States.		
The Raja of Nepál	53,000	2,000,000
The Raja of Lahore (Runjeet Singh)	50,000	3,000,000
The Ameers of Sinde	24,000	1,000,000
Scindia's Dominions	40,000	4,000,000
Belonging to the Afghán Empire	10,000	1,000,000
Total	1,280,000	134,000,000

Table of the Military Forces of the British in India, as laid before Parliament in 1819.

King's Troops, Cavalry	4,692
Do. Infantry	17,858
East India Company's European Artillery	4,583
Do. European Infantry	3,120
Do. Native Cavalry	11,011
Do. Native Infantry	132,815
Do. Native Artillery	8,759
Irregular Native Cavalry	7,659
Do. Native Infantry	17,082
Invalids and Pensioners	5,875
Grand Total	213,454
Efficient British Armies in the Field in 1818	95,000
With nine followers to every two fighting men	427,500
Making an aggregate of	522,500

	Sicca Rupees.
Revenue of every Description in 1817—1818	156,871,060
Acquisitions in 1818	14,358,953
	171,230,013

Or, £19,862,680

Table of the Principal Geographical Positions of Indostan, according to the most recent Astronomical Observations.

	Lat. N.	Long. E. from Lond.	Authorities.
	deg.m.s.e.	deg.min.sec.	
Cape Comorin	7 55 0	77 39 15	Hamilton Moore.
Anjengo road	8 40 0	76 55 15	Elmore, British Mariner's Directory.
Cochin	9 56 30	76 16 15	Connaiss. des Tems.
Cranganore	10 52 0	75 5 15	Brit. Mar. Direct.
Telicherry	11 45 0	75 26 15	Idem.
Cananore	11 51 0	75 24 15	Connaiss. des Tems.
Goa	15 38 0	73 45 15	Brit. Mar. Direct.
Idem	15 31 0	Id.	Connaiss. des Tems.
Idem	15 28 20	Id.	Pennant, Rennel.
Bombay	18 58 0	72 38 15	Brit. Mar. Direct.
Idem	18 55 43	Id.	Niebuhr.
Bassein	19 19 0	72 40 15	Connaiss. des Tems.
Diu, (cape)	20 42 0	70 47 15	Idem.
Idem	20 44 0	70 42 45	Elmore
Maddi Bender, (at the mouth of the Indus)	25 40 0	68 50 15	Rosily.
Pondicherry	11 55 41	79 51 45	Connaiss. des Tems.
Fort St. George, (Madras)	13 4 54	80 29 0	Idem.
Point Divy	16 6 0	80 30 15	Brit. Mar. Direct.
Point Godavery	16 45 0	82 40 15	Idem.
Ganjam	19 22 30	85 18 15	Connaiss. des Tems.
Balasore	21 30 20	87 10 15	Ritchie and Playsted.
Calcutta	22 35 0	88 10 0	Elmore.
Ceylon.			
Dondra Head	5 47 0	80 41 45	Idem.
Trincomalee, (road)	8 35 0	81 27 15	Idem.
Laccadives.			
Caroly	10 30 0	72 34 15	Mannevillette.
Maldives.			
North Point	7 5 0	74 4 15	Topping, quoted by Rennel.
Idem	7 15 0	73 40 15	Brit. Mar. Direct.
South Point	0 40 south	74 45 15	Idem.

BOOK LI.

CHIN-INDIA.

PART I.

Containing a general Account of this region; and a Description of the Birman Empire.

THE only region which remains to complete our description of Asia is that situated between China and Indostan, comprehending the Birman empire, the kingdoms of Tonquin, Cochin-China, Cambodia, Laos, and Siam, and the peninsula of Malacca. We have at present no generic name in universal use for this region. There has been a want of etymological felicity in the formation of such as have been proposed for it. It is often called "the Peninsula beyond the Ganges." It contains two well marked peninsulas; but, as a whole, it is even less entitled to be called a peninsula than the Deccan of Indostan, since a portion of it would be comprehended within the general outline of the continent, supposing the projections to be left out. Probably this appellation was first applied by persons who only had in view the peninsula of Malacca, and was extended to the remainder with a mixture of carelessness and reluctance for want of a better. Among other appellations also in use, are the less exceptionable ones of "India beyond the Ganges," "Exterior India," and "Further India." As part of this region was once subject to the Chinese government, and most of the races which inhabit it resemble the Chinese more or less in figure, physiognomy, and complexion, as well as in manners, religion, and language, the new name of Indo-China has been invented for it, and conceived to possess the recommendations of euphony and expressiveness. But we have no evidence of the subjection of this entire region at any period to the Chinese. The name of China belongs to one well-known empire, and could not, without impropriety, be applied to another country, unless it were to another empire or kingdom, which might, in that case, be distinguished by the addition of some epithet. This is done in the instance of the kingdom called Cochin-China, (or Marshy China.) Even that name has an awkwardness which is repugnant to good taste, though sanctioned by so long usage that no alteration is likely, in that instance, to be proposed. But it does not afford an example worthy of being followed in fabricating a new name, especially for a country consisting of a plurality of states. It will, therefore, be better to retain the term *India* as the leading name of this region. There will be less violence in extending the name of India to the confines of China, than in extending that of China over the eastern shore of the Bay of Bengal. India is more of a generic term than China, and this whole territory resembles India in various particulars, and, among others, in the political feature of being divided into several independent states, which have seldom been long united either by federal co-operation or by conquest. It will be very proper, at the same time, to make the partial Chinese character which it exhibits the foundation of a subordinate part of its name. The term *China* may be attached to that of India in the form of a genitive or adjective epithet. That country is not an Indo-China—a China resembling India. It is rather a Chinese India—an India with Chinese features. We would, therefore, propose a name for it expressive of this idea in a condensed form, by prefixing a single syllable to the term India. Influenced by these considerations, we shall use with our readers the freedom (which, after this explanation, we hope will not appear a great one) of henceforth designating this region under the appellation of Chin-India. We employ it with some confidence, as one which will, not only like other names, be rendered smooth by familiar use, but will secure the acquiescence of philological criticism.

This vast country, extending from the Bay of Bengal to the Chinese Sea, is scarcely known except along its shores. The interior presents a field of useless and troublesome conjectures. The whole, however, seems to be formed by three or four chains of mountains, which proceed from Thibet, and run south in directions parallel to one another. Between these mountain ranges are situated three long and magnificent valleys, besides several of a subordinate rank. These valleys are watered by three great rivers; that of Ava, that of Siam, and that of Cambodia. The higher parts of these rivers, though laid down in our maps, are unknown. It is not ascertained whether all the three arise in the high mountains, or if this is the case only with one of them, which, from that cause, has a much longer course than the other two.

The *Tsan-poo* of Thibet, which D'Anville considered as identical with the river of Ava, is decidedly the Brahmapootra, (commonly called the Booram-pooter,) which joins the Ganges, and falls into the Bay of Bengal. The first river of Chin-India is the *Irawaddy* or *Irabatty*, the great river of Ava, which is, perhaps, the *Ken-poo* of Thibet, though the point is not substantiated. Supposing this to be the case, we know nothing for certain of the length of the Ken-poo: only, it is quite unlikely that four or five great rivers should descend from the same table-land, preserving a perfect parallelism, and so close together, that the breadth of territory allowed them scarcely affords room to mark them in our

maps. If the Thaluan, or the river of Martaban, has, as some assert, a longer course than the Irabatty, we must consider it as the same with the Ken-poo ; and it would, in that case, be the chief river of the great valley lying between the mountains of Arracan and those of Siam. D'Anville considers the rivers of Martaban and Pegu as two mouths of one great river. Modern English travellers tell us that the river of Pegu is small, and rises but a short way from the sea. But these undoubtedly mean some small stream which falls into the Pegu river of D'Anville. Thus D'Anville, in assigning the course of the Noo-Kian, which comes from Thibet through China to the river of Pegu, and Buchanan, in giving that course to the Thaluan or river of Martaban, have told us precisely the same thing ; and the whole correction which Dr. Buchanan believes himself to have made reduces itself to that of giving a different application from D'Anville to the designation of "river of Pegu." For our own part, we consider the Noo-Kian as very probably the river of Siam, the Meinam. Of all the rivers of these countries this has the highest and most regular inundations ; whence it is reasonable to trace its sources to the most distant mountains in the centre of Thibet. Besides, we find that great gulfs generally receive large rivers. Loubere has given no plausible reason for the opposite opinion. He never saw the pretended sources to which he assigns a much more southerly situation. Yet his views are hitherto followed in all the maps, nor have we, in our atlas, represented it agreeably to the opinion which, after mature reflection, we have here ventured to express.[a]

The course of the Mei-Kong, the river of Cambodia, is, on the contrary, represented as very long. It is considered as the same which passes through Laos. But Duhalde says, that, according to the accounts of the Chinese, the capital of Laos was situated on a river which falls into that of Siam. D'Anville and Arrowsmith agree in making it proceed from the Thibetian Alps, where, according to the former of these geographers, it is called Lantsang-Kiang, and, according to the latter, Sat-Choo. Both make it pass through Yunnan. It would be somewhat singular for so long a river to travel to the extremity of a peninsula before finding an outlet. That course requires also to be reconciled with the testimony of the Chinese, who make the chief river of Laos to communicate with that of Siam. Shall we, for this purpose, admit, with Dalrymple, a branch called the Annan, to unite the Meinam to the Mei-Kong, in the same way as the Cassiquiari connects the Rio-Negro with the Orinoco ? All this is again contradicted by the account of the Dutch envoy, M. Wusthof, who, after saying that the Mei-Kong, or the river of Cambodia, has a course of 300 miles, represents its sources as in the north of Pegu, fifty miles from the capital of Laos ; two data which, even taken abstractedly, are not easily rendered consistent. We are informed too, by a recent traveller, that the inhabitants of the country describe Laos as a table land without any large river.[b] Admitting this opinion, we can easily conceive that the two rivers of Siam and Cambodia have some communication, but we should always consider that of Siam as having the most distant sources.

[a] This refers to the French atlas accompanying M. Malte-Brun's work.

It will be readily anticipated, that the direction of the mountains of Chin-India must be a subject of still greater uncertainty ; and accordingly we find this very difficult to determine amidst the chaos of contradictions advanced by travellers.

Of the four chains which are commonly supposed to exist, that which separates the Birman empire from Bengal becomes gradually lower in the kingdom of Arracan, till it is lost in small hills before reaching Cape Negrais.

The second, which seems to surpass all the others in height as well as in length, separates Pegu and Ava from the kingdom of Siam ; then stretches along the whole peninsula of Malacca, and ends at Cape Romania, in the straits of Sincapore. That cape is the southern extremity of Asia.

Of the third chain scarcely any thing is known. It seems to separate the kingdom of Siam from those of Cambodia and Laos. Perhaps it takes an oblique direction between Laos and Cambodia ; perhaps it gives off branches which encircle a central plateau. In the south it is considered as running along the east side of the gulf of Siam to its extremity, where Cape Cambodia separates that gulf from the Chinese sea. But that cape is formed of low land; and we have no evidence of its being the termination of a mountain chain.

The fourth chain is somewhat better known. It rises in the Chinese province of Yunnan, and bounds Tonquin and Cochin-China on the west, separating them from the kingdoms of Laos and Cambodia. For breadth and elevation this chain seems to rank among the most considerable in Asia.

To these imperfect notions of the physical structure of the Chin-Indian region, we are obliged to add information still more uncertain on the other leading points of its physical geography. The observations which travellers have made on the climate of the interior have all been hasty and imperfect. It undoubtedly contains several temperate regions. Such are those of the northern part of the Birman empire. The coasts are liable to intense heats. Yet these are moderated by the sea breezes, which are cooler and more humid than those of Indostan. But, as the seasons vary with the exposure of the different coasts, the particulars will enter into the descriptions of the respective countries.

The periodical inundation of the low valleys by the rising of the rivers is a circumstance common to all this region. But they observe different periods, and thus show that the mountains or table lands in which they take their rise must be at unequal distances.

The joint operation of the great heat and humidity imparts to the vegetation of Chin-India a character of singular vigour and magnificence. The contrasts of barrenness and fertility are here marked in the most striking manner. A burning sun reduces to the state of a light powder, or to that of a crust hard as rock, those soils where the rain-water does not fall in the requisite abundance, or remain sufficiently long. But along the margins of the rivers, and on the sides of the mountains, an eternal verdure and an aspect of peculiar grandeur, from towering tops and extended foliage, characterize the mighty trees of those climates, in com-

[b] See afterwards our account of Laos and Lac-Tho.

parison of which the "kings of our forests" dwindle to the rank of humble vassals. These giants of the vegetable creation are surrounded by shrubs and herbs, which exhibit in their flowers and fruits, forms the most singular and diversified, and colours the most vivid, while they dispense flavours and odours the most delicious.

Two of those which add dignity to the forests, are the *Alöexylum verum*, or eagle-wood, and the white sandal-wood, which are used as perfumes in all the palaces of the east. The teak of that country surpasses the English oak for durability in ship-building. The iron-wood is quite common. The true ebony is indigenous in Cochin-China. In every district we find the sycamore, the Indian fig, and the banana, which, by the exuberance of its large leaves, forms a grove of itself. There are other trees rivalling these in beauty or in stateliness; such are the *Bignonias*, the fan-palms, the *Calophyllum*, which shoots up higher than the pine, the *Nauclea orientalis*, and the *Agallochum* of Cochin-China, the leaves of which display a rich purple on their inferior surfaces.

Chin-India is singularly rich in aromatic and medicinal plants, and in those useful in the arts. Ginger and cardamoms grow wild on the banks of the rivers, or are cultivated in large plantations. The cinnamon tree grows abundantly on both coasts of the peninsula of Malacca, and is sometimes accompanied by the nutmeg. Turmeric is used by the inhabitants of these countries to tinge and season their rice and other dishes. Their favourite spices are betel leaf, and the fruit of the long pepper and black pepper, to which they add three or four species resembling long pepper, and the grains of the *Fagara piperita*, or long pepper of Japan. Among the different dye-stuffs are distinguished the carmentine, or *Justicia tinctoria*, which affords a beautiful green; three species of *royoc*, viz. the *Morinda umbellata*, *carthamus*, and *gambogia*, all of which are yellow dyes; indigo; and the red wood of the *Lawsonia spinosa*, and sapan. The bark of the *Rhizophora gymnorhiza* gives a beautiful red dye. The gum resin called dragon's blood seems to be the produce of more than one plant, among which are the *Dracœna ferrea*, and the rotang,[a] natives of Cochin-China. Among the plants subservient to industry, we shall mention the *Pimelia oleosa*, from which an oil is obtained that enters into the composition of the Chinese varnish; the sumach of Java, another varnish tree; the *Croton lacciferum*, from which is obtained the valuable red lac, the produce of a species of ant which nestles on it, and elaborates its gum,[b] his ordinary food; and finally, the tallow tree, the *Sebifera glutinosa* of Loureiro, the *sapium* or *Gluttier porte-suif* of Jussieu, the fruit of which yields a thick and very white oil, from which are made candles of a handsome appearance but unpleasant smell.

From these countries we also obtain, for medicinal purposes, jalap, scammony, the bark of the *Nerium antidysentericum*, called *codogapala*, that of the *Laurus culilaban*, the fruit of the *Strychnos nux vomica*, cassia, tamarinds, aloes, camphor, and castor oil. The sugar cane, the bamboo, spikenard, three celebrated plants of the family of reeds, are found in all these countries: the first two in the rich marshes, the last on the dry hills. The sweet potato, the egg-plant,[c] and the love apple; melons, pumpkins, water melons, and a great quantity of other nutritious plants, enrich the plains. The banana, the cocoa, and the sago palm afford a most liberal supply to the wants of the inhabitants. Of fruits they have a great variety. The vine grows in the forests, but for want of culture, as well as the excessive heat, its fruit is much inferior to that of Europe. To make up for this disadvantage, they have the orange, the lemon, the citron, the delicious mango, the pine-apple, the *litchi*, (the *dimocarpus* of Loureiro, and the *euphoria* of Jussieu,) the mangosteen, and a multitude of other fruits unknown in Europe. We may also take notice of the *Phyllodes placentaria*, the leaves of which are used for wrapping up provisions, in order to heighten their colour and improve their flavour, and are also mixed like the *Amomum galanga*, with the fermented liquors obtained from rice and from sugar.

The most remarkable animals of this region are the Indian elephant, the single horned rhinoceros, the tiger, the leopard, the bear, the ourang-outang, many other species of monkeys, the gibbon, the baboon,[d] the pithecus, and two others not yet fully known; Forbin's great ape of Malacca, and the white ape with red eyes mentioned by Compagnon. Among the wild inhabitants of the forest are the *bubalus*,[e] the stag, several species of antelopes, as the *oryx*, the *strepsiceros*, the *albipes* of Erxleben, and the *tragocamelus* of Pallas. The zibet and the porcupine are also found in these countries.

That portion of the Birman empire which, according to M. Gosselin, corresponds to the *Golden Chersonese* of the ancients, is very rich in minerals, and produces some very singular species, whilst Malacca, which had been previously taken for the golden Chersonese, scarcely produces a mineral of any value with the exception of tin. The rivers of Pegu still contain grains of gold, and in ancient times, their sands were probably much richer in this precious metal than now. The custom of gilding the ceiling and the cupolas of the temples, seems to have existed from very remote times. We are told that the temple of Shoemadoo was built about 500 years before the Christian era. If that was the case, the brilliancy of so splendid an edifice may have given rise to the term "Golden Chersonese." Or the ancients may have been in possession of some vague tradition respecting the whole Chin-Indian region. Gold and silver abound still more in Tonquin and Cochin-China than in the Birman empire.

After this general sketch of the physical geography of Chin-India, let us take a general view of the nations which inhabit it, the languages which they speak, and the religions which they profess.

With the exception of the Malays, who form a distinct race, mostly spread over Oceanica, the other Chin-Indian nations resemble the Mongolian and Chinese

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[a] *Calamus rotang.*

[b] The lac is the product of a species of *Coccus*, and is said to be the nest of the insect. It is like wax, an animal product, but whether elaborated from the gum of the Croton, is at least doubtful.—P.

[c] "Mêlongène," *Solanum melongena.*

[d] "Le magot."

[e] "Bubale" wild buffalo.

races in their figure, their square countenances, their yellow complexions, strong hair, and small oblique eyes. Hence we may safely consider them as of the same original stock. The Chinese have always extended along the eastern and southern shores of Chin-India, where they have introduced their written characters, and in some degree their language. The Birmans seem even to have preserved a tradition of the arrival of a Mongolian colony of 700,000 warriors. Such traditions would still lead to the inference that the first inhabitants had belonged to these countries from time immemorial.

We are informed that besides the prevailing race, there is in the mountains, especially those of Cochin-China and Laos, a savage nation called Kemoys or Moys, who are black like the African Caffres. They seem nearly connected with the Haraforas of the Philippine islands and the other negroes of Oceanica.

All the original languages of these nations, with the exception of the Malay, exhibit the same characteristic simplicity, poverty, and deficiency, with the monosyllabic languages of Thibet and China. They are, however, in their present state, subdivided into three very distinct classes. The *Boman* or *Birman* language is spoken in Ava and Arracan; the *Siamese* language prevails in the kingdoms of Siam and Laos; and the *Annamitic* language is used in Annam, *i. e.* in Tonquin and Cochin-China, perhaps also in Cambodia. These languages are more or less mixed with Chinese or Hindoo, according as the nations which speak them are situated near Indostan or China.[a]

The dialect of Pegu differs entirely from these three; but it is not well known. The Malay, which extends over the whole of Oceanica, contains a mixture of Sanscrit, with some Birman or Siamese roots, to which many Arabic words have been added, in consequence of commercial intercourse, and the prevalence of the Mussulman religion.

The religion of Buddha, derived from Indostan, prevails, under a diversity of forms, over this whole country. It has probably become incorporated with various local and national superstitions, which it has not entirely superseded. The sacred writings of this sect are in the *Bali* or *Pali* language, a dialect derived from the Sanscrit, and probably the same which was spoken in Magadha, or southern Bahar.[b] This rich, harmonious, and flexible language, has become the language of religion, and that of the priests and learned in the whole of Chin-India, with the exception of Malacca, Cochin-China, and Tonquin. The Mahometan religion has excluded it from Malacca, while Cochin-China and Tonquin have been pervaded by the language and philosophy of the Chinese, introduced by colonies from that nation. Buddhism prevails there in the form which it has assumed in China, and Buddha is adored under the name of Fo.

Some of these general views of the nations now under consideration, will be farther unfolded in the account which we are now to give of the different leading divisions of this part of the world.

The Birman empire is the first political state which we meet in proceeding eastward from Indostan. It includes the kingdom of Ava, and the conquered provinces of Cassay and Arracan, on the west; Lowashan and Yunshan on the east; and Pegu, Martaban, Tenasserim, Mergui, Tavoy, and Junkseylon, on the south.

In Dalrymple's Oriental Repertory, the Birmans are called *Boraghmans*. In the Birman alphabet, published at Rome in 1776, the name is written *Bomans*.[c] They are also called *Mienmay*. Their native country is Ava Proper. They were at one time subject to the king of Pegu; but in the sixteenth century this numerous and warlike people revolutionized the country by taking possession of Ava, and then of Martaban. The Birmans continued masters of this country till 1740, when a civil war broke out in consequence of a revolt in the conquered provinces of Pegu, and was prosecuted on both sides with savage ferocity. In 1750 and 1751, the Peguans, with the aid of arms imported by Europeans, and the active services of some Dutch and Portuguese, beat their rivals, and in 1752, Ava, the capital, surrendered to them at discretion. Dweepdee, the last of a long line of Birman kings, was taken prisoner, with all his family, except two sons, who escaped into Siam. Binga Della, king of Pegu, returned to his hereditary dominions, leaving the government of Ava to his son[d] Apporasa. When the conquest appeared complete and settled, one of those extraordinary characters which Providence sometimes raises up to change the destinies of nations, now appeared. This was a Birman called Alompra, a man of obscure birth, known by the name of "the huntsman," and the chief of Manchaboo, then a poor village. Having collected round him 100 picked men, he defeated the Peguan detachments in small skirmishes. Improving in experience, and acquiring confidence in his own strength, he attracted more numerous followers; and in the autumn of 1753, suddenly advanced, and obtained possession of Ava. Defeating the king of Pegu in several subsequent engagements, he invaded his territories, and in three months took his capital, which he gave up to indiscriminate plunder and carnage. Having sustained some indignities from the Siamese, he invaded Siam; but, during the siege of the metroplis of that kingdom, his career of conquest was suddenly terminated in 1760 by a fatal disease in the fiftieth year of his age, and ninth of his reign. Alompra was succeeded by his son Namdojee Praw, a minor. Shembuan, the uncle of this prince,[e] brother to Alompra, acted as regent, and, on the death of his nephew, assumed the crown. Shembuan declared war against the Siamese, and took their capital in 1766, but did not retain permanent possession of that country. In

[a] Leyden's Memoir on the Indo-Chinese Languages, in the 10th volume of the Asiatic Researches.

[b] Lolliere, in Petity, Encyclopédie Elémentaire, II. part 2, p. 623. Paullinus a Sanct. Barth. Examen codd indic. p. 41.

[c] Braghmans—M. B.; Bomans, Alphabet. Barman., Rome, 1776; Borakhmans or Burraghmans, Dalrymple.—M. B.

[d] His brother.—M. B.—*Edin. Encyc.*

[e] Namdojee governed alone, and died in 1764, leaving an infant son named Mornien, (Momien,—M. B.) Shembuan, the uncle and guardian of the minor, [younger brother of Alompra,—M. B.] exercised at first the office of regent, and then usurped the government.—*Edin. Encyc.*

The translator has confounded Namdojee with his infant son. It is not stated by Malte-Brun or the Ed. Encyc. that Shembuan was regent to Namdojee, and assumed the crown after his death, but that he was at first regent to his infant son, whom he deprived of the crown by usurpation.—P.

1767 the empire was invaded by a Chinese army, 50,000 strong, on the side of Yunnan, which advanced as far as a village called Chiboo; but the Birmans cut off their supplies, and then destroyed the whole of them, except 2500, who were sent in fetters to the Birman capital, compelled to labour in their respective trades, and encouraged to marry Birman wives, and become naturalized subjects. Shembuan subdued Cassay in 1774, and died in 1776. His son and successor, Chenguza, a debauched and bloody tyrant, was dethroned, and put to death in 1782, in a conspiracy headed by his own uncle Minderagee, who took possession of the government.[a] This prince was the fourth son of Alompra. In 1783 he sent a fleet of boats against Arracan, which he easily conquered. He then marched against Siam, where he met with some checks; and, finding himself unable to retain possession of the interior, was obliged to content himself with the dominion of its western coast, as far south as Mergui, including the two important sea ports of Tavoy and Mergui, which were ceded to him by a treaty of peace in 1793.

In 1795 his Birman majesty marched an army of 5000 men into the English province of Chittagong, holding an army of 20,000 in readiness to join them in Arracan. His object was to claim three notorious robbers, who had taken refuge in that country. This force was confronted by a strong detachment from Calcutta. The affair was amicably adjusted by the delivery of the refugees, whose enormous guilt was established, and the Birmans withdrew without committing any disorders. The English Capt. Canning, who visited the Birman capital in 1809, found that it had deteriorated during the declining years of Minderagee Praw, who, naturally superstitious, cruel, and despotic, had become insupportably suspicious and irascible. He had abandoned Ummerapoora, his capital, and fixed his court at a place called Mengoury, seven miles up the river, consisting of a cluster of sand-banks, where he was absorbed in melancholy, and occupied in the composition of drugs and charms for the prolongation of his life. The opposition to which his capricious cruelties gave rise rendered the country a scene of anarchy, rebellion, and robbery. More recently some absurd attempts have been made by this barbarous court to extend their influence to the west, at one time by claiming the provinces of Dacca and Chittagong, and at another by carrying on an intriguing correspondence with the Brahmins at Benares, by sending emissaries, in the disguise of merchants, to Dacca, on their way to the Seik territories, and others to Madras and Trincomalee, for the purpose of raising a general combination of the Indian governments against the British. These proceedings, and some hostile preparations which appeared to be made on the frontier, were never followed by any important events. In June, 1819, Minderagee Praw died, and was succeeded by his grandson. The junior branches of the family revolted, and scenes of massacre ensued.[b]

The Birman empire includes a space between the 9th and 26th degrees of north latitude, and between the 92d and 104th of east longitude; being about 1050 geographical miles in length, and 600 in breadth.[c] Its northern boundaries are perhaps still more distant; but its limits in that direction, and to the east, are fluctuating. It probably may contain 194,000 square miles.

Though this empire extends into the torrid zone, it enjoys a temperate climate, in consequence of the elevation of its territory. The healthy and robust constitutions of the natives show the salubrity of the climate. The seasons are regular. Extreme cold is unknown, and the intense heat which precedes the rainy season is of short duration. This country exhibits every variety of soil and exposure. A flat marshy delta extends along the mouths of the Irawaddy. Beyond this are pleasing hills, picturesque valleys, and majestic mountains. The fertile soil of the southern provinces yields crops of rice equal to those of the finest districts of Bengal. Although the surface is more irregular and mountainous to the north, the plains and valleys, especially those situated on the banks of the great rivers, produce excellent wheat, and the different corn and leguminous crops which are cultivated in Indostan. Sugar canes, excellent tobacco, indigo, cotton, and almost every kind of tropical fruits, are indigenous in this favoured country. Agriculture is said to be in an improved state, though the methods followed have never yet been satisfactorily described. In a district to the north-east of Ummerapoora, the tea leaf grows, but not equal to that which is produced in China, and seldom used except as a pickle. The teak tree grows in all parts of the country, though properly a native of the

[a] Previously, however, Mornien, the son of Namdojee, was raised to the throne, where he continued only 11 days, being deposed by Minderagee.—P.

[b] In 1824 a war commenced between the British and the Burmese, which terminated in the entire success of the former in 1826. The causes of the war were the invasion of Shipuree island, on the S. E. frontier of Chittagong, the capture of a British schooner on the coast of Arracan, and the invasion of Cachar and Jynteeah, states under British protection. Hostilities commenced on the E. frontier of Sylhet and Chittagong, in Feb. 1824, in which the British received some checks from Bundoolah, who afterwards became so famous on the Irawaddy. These, however, were followed by a series of successes, in which they were assisted by Gumbheer Sing, the Rajah of Cachar, which ended in the entire occupation of Cachar, Munipoor, and Assam, and in driving the Burmese into their own territories, beyond the river Ningti. In April, 1824, an expedition sailed from Madras, under Gen. A. Campbell, and May 16th took possession of Rangoon. Hostilities then commenced on the Irawaddy, and continued, with several interruptions, till the conclusion of peace. The British had advanced to Kemendoon, when they were met in December by Bundoolah with an army of 60,000. In a contest of six days he was defeated and his army dispersed. The British continued to advance, opposed but unsuccessfully by Bundoolah, who was killed in an engagement, April, 1825. Prome was then taken. Hostilities then ceased for a time, and negotiations were attempted. In the meanwhile the British had taken possession of Arracan, Syriam, Martaban, and the coast of Tenasserim, S. to Malacca. The Birmans having collected an army of 80,000 at Meeady, 40 miles above Prome, recommenced hostilities in November, but were entirely defeated and driven from their lines December 1st and 2d. The British then advanced 120 miles without opposition to Patanagoh, where negotiations were resumed, and peace concluded Jan. 3d, 1826. This not having been ratified at the stipulated time, Jan. 18th, the British again defeated the Burmese at Melloon on the 19th, and dispersed their army. They then advanced till within 45 miles of the capital, where peace was again concluded and ratified, Feb. 24th. The Burmese were required by the treaty to cede Arracan, Martaban E. of Martaban R. Tenasserim, Yeah, Tavoy, and Mergui, to pay one crore of rupees, and to allow equal commerce and security to all subjects, without regard to the part they had taken during the war. Assam, Cachar, and Munipoor, were taken under British protection. Since the evacuation of the Burmese territories by the British, the Peguers have attempted to throw off the Burmese yoke, but without success. By the last accounts hostilities still continued.—P.

[c] "380 French leagues long, 50 to 180 broad."

mountains. Almost every kind of timber found in Indostan is produced in the southern parts. Fir grows n the mountains, and turpentine is extracted from it; but the natives do not use the wood in carpentry, being prejudiced against it on account of its softness. The forests here, as in Indostan, are exceedingly unhealthy. Even the wood-cutters, a race inured to this situation and mode of life, are said to be very short-lived.

The animals are the same with those of Indostan. The only singularity which has been observed is the total absence of any sort of jackal. The plains are well stocked with cattle; but in the neighbourhood of the forests they are exposed to frequent ravages from the tigers, which are very numerous in this country. Pegu abounds in elephants.

The chief minerals are found in Ava Proper. Six days' journey from Bamoo, near the Chinese frontier, are the gold and silver mines of Badooem. There are also mines of gold, silver, rubies, and sapphires, now open in a mountain called Woobolootan,[a] near the river Ken-duem. But the richest, and those which produce the finest gems, are in the neighbourhood of the capital. Precious stones are found in several other parts of the empire. Iron, tin, lead, antimony, arsenic, and sulphur, are in great abundance. Great quantities of very pure and transparent amber are dug up near the river, and gold is found in the sands of the mountain streams. One of these in the north, situated between the Kenduem and the Irawaddy, is called "the stream of golden sand," (Shoe Lien Kioop.) There are no diamonds or emeralds in the empire; but it has amethysts, garnets, beautiful chrysolites, and jasper. There are, near Ummerapoora, quarries which yield marble equal to the finest in Italy. It is monopolized by the government, and consecrated to the making of images of Gaudma. This empire contains celebrated and very productive petroleum wells, which yield a large revenue to government, being retained as a monopoly.

We shall now take a view of the provinces or kingdoms composing this empire, and their principal towns.

Cassay, in the north-west corner, adjoining the kingdom of Assam, is called in Sanscrit the country of the Muggaloo, which has been transformed into Meckley. It was formerly an independent state. Its capital, Munnapoora, is large and flourishing.[b] The inhabitants call themselves Moytai.

The kingdom of Cachar, (or Katchar,) which we have already mentioned[c] as usually subject to the Birmans, adjoins Cassay. The capital is Caspoor, called Kospetir by the Portuguese historian Joam de Barros. The inhabitants are of Hindoo extraction, and are called Banga in their own language, and Aikobah by the Birmans.

The kingdom of Arracan, properly called Rokhang, between Ava and Bengal, is a continuation of the Chittagong plain, bounded on the east by a range of mountains, the southern part of which runs parallel to the sea coast, at a distance sometimes of 100, sometimes of only ten miles. From Chittagong it could not be entered by an army, except along the sea beach. The shore is studded with numerous islands and rocks, from which the country is seen, agreeably diversified with wooded hills and dales, and enlivened with numerous torrents. The river of Arracan is said to have a good entrance, without bar or shoals; and its situation, in a rich and wooded country, intermediate between Pegu and Bengal, would make it a good station for a timber depôt: but it has never been accurately explored, though the English had a factory here in the 18th century. During the south-west monsoon, however, the current and the wind would render it difficult for a vessel to get out of this river. The interior of the provinces is little known, but is supposed to be similar to that of Chittagong. The maritime tract maintains a considerable intercourse with Bengal, especially with Chittagong, to which it exports small horses, ivory, wax, gold, and silver. The viceroy or rajah is always the chief merchant. During peace, merchants travel over from the cities of Ava, and fit out forty or fifty boats for Bengal, each of which carries a cargo valued at 4000 rupees, chiefly in silver bullion. One half of them regularly return with red betel nut, chiefly from Luckipoor, where they farm the plantations of this article. Rice is also exported from Arracan, and from the contiguous islands, which are uncommonly fruitful. There is also, during the northeast monsoon, a general coasting trade along this shore, between the southerly and easterly parts of the Birman coast and Calcutta, including all the intervening sea-ports. The province of Arracan, however, has of late years suffered most calamitous alterations, in consequence of the increasing tyranny of the government. An insurgent of the name of Kingberring had in 1812 destroyed nearly all the cattle, the grain, and the orchards.—The natives are Buddhists in religion. Their language is monosyllabic. They have great difficulty in pronouncing any word ending with a consonant. They were long independent, previously to their subjugation by the Birmans; and, though invaded by the Moguls and the Peguans, had never been so far subdued as to acknowledge vassalage to a foreign power. The province is governed by a viceroy, called the Maywoon. In 1783 it was incorporated with the Birman government. In 1811 the insurgent, Kingberring, subjected the whole province, but was defeated in that and the following year. No quarter was given in this contest, and entire villages were exterminated. The refugee Arracaners, called Mughs, are said not to be encouraged by the British, into whose dominions they have retired; but their determined character, and the extreme unhealthiness of their haunts to all who enter them from the west, render it a very difficult and expensive undertaking to expel them. The city of Arracan is in latitude 20° 40′ N. and longitude 93° 5′ E.[d] It has a fort in the middle, surrounded by houses, except on the north-east, where it has a large lake. The

[a] "Wouboşou-Taun."

[b] Asiatic Researches, vol. V. p. 223.

[c] See p. 473 of this volume.

[d] The city of Arracan is situated on the Mayoo (or river of Arracan) which has 3 or 4 mouths. The country in its neighbourhood is fertile, populous, and well cultivated It is occupied by the Mughs, a robust race. The city is intersected by numerous branches from the Mayoo. The houses are low, built on piles or posts, and constructed of bamboo. The population, before its recent capture by the British, was 95,000. The fort consists of four concentric walls, 20 feet high, inclosing a citadel. The neighbouring hills are covered with the gilt spires of more than 60 pagodas. These, with the fort, are the only stone buildings belonging to the city. *As. Journ.*—P.

Birmans found considerable booty when they took this place in 1783. The object which they valued most was a brazen and highly burnished statue of Gaudma, about ten feet high, which had been for centuries visited by venerating pilgrims from remote countries, being considered as a direct copy of the original Rishi, taken from the life. This statue, along with five gigantic images of Racshyas, or demons, and an enormous gun, thirty feet in length, were carried off in triumph to Ummerapoora by water.[a]

On the Arracan coast is the island of Cheduba, the most westerly of a considerable cluster of inhabited and fertile islands. It is said to have a good harbour. The channel between it and the main land is navigated by boats, but not safe for large vessels. It is governed by a Chekey or lieutenant, deputed by the Birman government.

The kingdom of Ava, separated from Arracan by the Anoopectoomiu[b] mountains,[c] includes a vast extent of territory, the interior of which, lying towards Yunnan, is almost entirely unknown to Europeans. The ancient capital, Ava, is now in ruins; the materials of the houses, which consisted chiefly of wood, having been removed to the new city of Ummerapoora; but the ground still retains traces of former streets and houses, and the walls of the forts and the embankments by which they are connected with the country, are conspicuous. There are also several temples standing, two of which are eminently sacred; the one containing a statue of Gaudma, twenty-four feet high, formed of a single block of marble, and called Logatherow Praw; the other, Shoe-gunga Praw, is the favourite place for the administration of the most important oaths. These temples suffer a gradual decay, no violence having ever been offered to them. The whole scene exhibits a most striking assemblage of ruins, the ponderous monuments of human labour being overrun with ivy, brambles, and other wild vegetation.

The modern capital Ummerapoora, four miles east from the preceding, stands on the banks of a deep and extensive lake. Its site being quite peninsular during the periodical floods, exhibits a splendid appearance, from the number and variety of the boats, the great extent of the water, and the height of the surrounding mountains. Venice is the place with which it is most fitly compared. The fort is an exact square, with four principal gates, and a small one on both sides of each, making twelve in all. At each corner there is a large projecting bastion. It is respectable as an eastern fortification, and considered by the natives as impregnable, never having been assaulted by any enemy skilled in artillery tactics. The city has a few houses of brick and mortar, which belong to the royal family. All the houses are roofed with tile; and it is the custom to have earthen pitchers filled with water standing on the roof to be ready for extinguishing accidental fires. The unbounded expenditure of gilding on the roofs of the religious buildings both without and within, gives the city an extraordinary degree of splendour. There is in some of the streets a brilliant display of Birman utensils, and silversmith's goods. In 1810, when Captain Canning visited the place, most of the shops had disappeared, and the entire city, including the fort and palaces, had been destroyed by fire. The royal library is in an angle of the fort, and consists of 100 ornamented chests, well filled with books of history, romance, medicine, music, and painting, but chiefly divinity. There are four magistrates, each of whom has a district of the city allotted to him, and a regular order of lawyers is attached to their courts of justice as agents and pleaders. Ummerapoora was founded in 1783 by the same monarch who afterwards capriciously abandoned it for a comparatively wretched situation higher up the river. In 1800 the population of Ummerapoora was estimated by Captain Coxe at 175,000, and the houses from 20,000 to 25,000; but in 1810, Captain Canning was of opinion that the population had diminished one half.[d]

Bamoo, in the northern quarter of the empire, is only twenty miles from the Chinese frontier, and was taken from that nation by the present Birman dynasty. It is in Lat. 24° N. Long. 96° 56′ E.

Monchaboo, though a small place, is greatly venerated as the birth place of Alompra, and was the capital during his reign. Lat. 22° 40′ N. Long. 96° 20′ E. Chagaing, in Lat. 21° 54′, and Long. 96°, is the great emporium for the cotton which is embarked for the Chinese market. It is a great religious resort on account of its numerous temples. It is celebrated for the manufacture of idols, and of fire-works, particularly rockets of uncommon size, in which the Birmans take great delight. Forty miles down the Irawaddy, are the splendid ruins of Pagahm, once the residence of a long line of kings, but abandoned as the metropolis in consequence of a supposed divine admonition. Long after this it continued to be the second city in the empire; but in 1809 it had been sacked by the insurgent Nakonek. The remains of its innumerable temples prove it to have been a place of extraordinary splendour. Sillahmew was in 1795 a large town, embellished with temples, and famous for a manufactory of strong and richly coloured silks, but when visited by the British mission in 1809 it was found ruined and deserted, having, like the preceding, fallen a prey to the ravages of Nakonek.

Shembigewn, on the Irawaddy, is eight days' journey from Ummerapoora. Here the road to Arracan branches off. Yanangheoom another town a few miles from the former, is chiefly inhabited by potters. Five miles east from Yanangheoom, are the celebrated petroleum wells already mentioned, which are dug to a depth of thirty-seven fathoms, and about four feet wide. Iron pots are let down to receive the petroleum. When the produce fails, the well is deepened through the hard

[a] Zodiacal sculptures and sphynxes have been recently observed at Arracan.—P.

[b] Atoopec.

[c] According to Capt. Ross, who recently crossed these mountains, the highest ridge is called by the Birmans, Romah Pokoung Toung. They are also called Youma mountains. They are inhabited by several tribes, distinct from the Birmans, among which are the Shams, Kareens and Kyongs. The latter, called also Kicaan or Kiayn, lead an independent life in the recesses of the mountains. They are an original people, smaller than the Birmans. They have no chief, but in their disputes, they appeal to their priests. They worship a particular tree and sacrifice cattle to it. They also worship aërolites and the heavenly bodies. *As. Journ.*—P.

[d] Ummerapoora has been deserted, and Ava, the old capital, rebuilt, 1821–4.—P.

rock, to renew the spring. This commodity, which is in great abundance, is sold very cheap on the spot. Its principal expense consists in the earthen pots which contain it, and the charge of carriage.

Prome, on the east side of the Irawaddy, in Lat. 18° 50′ N. and Long. 95° E. is on the boundary which separates Ava Proper from Pegu. In 1795 it was larger and more populous than Rangoon, and was supposed to contain 40,000 inhabitants, but in 1809 it was found deserted, its shops shut up, and the population consisting mostly of old men, women, and children.

Ava contains several half savage tribes. The southern forests are inhabited by a peaceable race called the Karaines. The Kains, or Yoo, live in the hills between Ava and Arracan, forming four vassal principalities, and speaking a dialect of Birman.[a] The northern parts adjoining Thibet, are inhabited by the Leess.[b]

The eastern parts of Ava are scarcely known, where the kingdom of Lowashan extends along both sides of the river of Pegu. Two towns of this province are mentioned under the names of Quan-tong, and Chiamay. Near this last is a lake, which in the maps of the sixteenth century was grossly exaggerated in size, and represented as the origin of the four rivers of Ava, Pegu, Siam, and Cambodia; an idea now rejected.[c]

In these obscure regions, old travellers mention a city and country under the name of Barma, or Brama, which they describe as a separate kingdom from Ava, and whose king sometimes carried on wars against the king of Ava.[d]

The kingdom of Pegu occupies the low lands watered by the Irawaddy, and the Thalayn,[e] and comprehends the sea coast from Arracan to Siam. The name appears to be a corruption of Bagoo, the vulgar name of the capital.

About a day's journey to the south of the capital, the country is much infested by elephants, which devastate the early crops of rice and sugar-cane. This country is relieved from many severe laws by which it was oppressed as a conquered country; but still its native inhabitants are not admitted to places of trust and power. Containing much timber, particularly teak, this province has long been famous for ship-building. The Arabs built vessels here in 1707. The inhabitants were more early civilized than the Birmans, and were once a powerful nation. Their language, which is called Mon, is quite original, being neither related to the Birman nor the Siamese. The country has continued in a state of great desolation since the sanguinary wars of the Birmans. In 1812, 3000 men were demanded as the quota of the thirty-two districts of Pegu, for the Arracan war; but it was found impossible to collect that number.

The city of Pegu is ninety miles up the river from Rangoon. The fort and all the houses were destroyed by Alompra, and the people carried into captivity; the temples alone were spared. About 1790, Minderagee issued orders to rebuild the city. Several priests returned to it, a few poor families, and some followers of the court, as the viceroy fixed his residence here. The merchants and artisans continued to live at Rangoon. In 1795 its inhabitants were 7000. It is now fenced round with a stoccade eleven feet high. The houses being extremely combustible, a long hook is placed at each door for pulling down the thatch in case of fire, to prevent it from spreading. The most remarkable object at this place is Shoemadoo, the only temple which has been kept in repair. It consists of a solid pyramid. The diameter at the base is 162 feet. At the base it is octagonal, and spiral at the top. Its height is 361 feet. On the top is a *tee* or gallery, in the form of an umbrella, fifty-six feet in circumference, supported by iron pillars, the whole being superbly gilt. The building is of brick and mortar. Its name seems to be compounded of *shoe*, the term for gold, and *madoo*, a contraction for *Mahadeo*. It is said to have been built 600 years before Christ. It seems to have been known to Marco Polo. He describes the mausoleum erected by a king of Mien, the towers of which were covered with gold, and adorned with a multitude of small silver bells, which, when moved by the wind, emitted agreeable sounds. These towers were of a pyramidal form. If these delineations are not sufficient to show that this traveller described the temple of Shoemadoo, they prove, at least, that the taste of the Peguans in architecture has not changed for several ages.

The principal sea-port of the empire is Rangoon in Pegu. The entrance of the river, below this place, resembles that of the Ganges, but is more commodious for navigation. The town stretches about a mile along the banks of the river, and is not more than a third of a mile broad. In 1795 it contained 5000 taxable houses. In 1812 they had been reduced to 1500, by fire and bad government. A little above the mouth of the Pegu river is Siriam, formerly one of the chief ports of the kingdom. It was a place of considerable trade while the Portuguese first, and afterwards the Dutch, had a factory at it. It was the mart for rubies. There was then a great exportation of earthen ware, tin and rice from Martaban, the capital of an ancient kingdom, and a much frequented harbour, before the Birman monarch shut it up. The same trade was also carried on at Tavoy.[f]

Among the places taken by the Birmans from the king of Siam to the south of Pegu, are Tavoy, and Tenasserim, each of which names is applied to a country, a river, and a town. Below the city of Tenasserim, about six miles from the mouth of the river of that name, is the sea-port of Mergui, which is governed by an officer sent from the Birman capital. At this place, a number of Mahometans are settled, and some Romish Christians, who have a priest and a church. The Mer-

[a] Asiatic Researches, vol. V.

[b] "Lisse."

[c] The Plaw are a nation, N. E. of Pegu, bordering on Siam and Laos. Their country is level and bounded E. by mountains. Their capital is in 19° N. and contains 5000 inhabitants. They resemble the Chinese in person, dress, &c. and are Buddhists. Marriage is only a civil contract, and their women are free. They trade in rice, cotton, tea, gold, stream tin, iron, and lead, which last is very abundant. *As. Journ.*—P.

[d] Mandelslo, Itin. p. 114.

[e] "Thaluyan, Thalien." *San-luen.*—P.

[f] Since the Burmese war, the British have commenced a settlement (Amherst town) at the mouth of the San-luen river opposite Martaban and within the ceded territory. The disaffected population within the Burmese territories have flocked to it, and it has the prospect of becoming an important place. The American missionaries at Ava who had been imprisoned and harshly treated during the war, have since made this their station.—P.

gui islands, an archipelago extending along this coast 135 miles, are not inhabited, though the soil is said to be fertile.

To the south of these is the island of Junkseylon, about fifty-four miles long and fifteen broad, separated from the main-land by a shallow channel, a mile in breadth, which is nearly dry at low water. It has a harbour called Popra at the north end, which may be entered over a mud bar during the spring tides, by ships drawing twenty feet of water. The anchorage round the island is generally good. It was a place of great trade previously to the establishment of Prince of Wales' Island. It has valuable tin mines, which are worked by the natives; the metal is smelted by the Chinese. Its chief town is Terrowa. It was taken from the Siamese in 1810. It now forms the southern extremity of the Birman empire, and is inhabited by a mixture of Malays, Chinese, Siamese, and Birmans. It is governed by a mayoon sent from Ava, who watches with jealousy the approach of any European ship of war, but merchant ships readily obtain refreshments on reasonable terms.

The Birmans differ remarkably in physical and in moral character from the Hindoos. Lively, impatient, active, and irascible, they have none of the habitual indolence of the natives of Indostan, nor are they addicted to that gloomy jealousy which prompts so many eastern nations to immure their females in the solitude of a harem. The sexes have equally free intercourse as in Europe, but they treat the women as an inferior order of beings. Their testimony in a court of justice is less valued. They are often sold or lent to strangers without blame or scruple. They are much engaged in labour, and, on the whole, faithful to the conjugal tie. The Birmans participate of the Chinese physiognomy. The women, especially in the northern parts, are fairer than those of the Hindoos, but less delicately formed. The men are not tall, but active and muscular. They pluck their beards, and thus give themselves a youthful appearance. Both men and women colour the teeth and the edges of the eye-lids with black. Marriages are not contracted before puberty. Polygamy is prohibited, but concubinage is admitted without limitation. The bodies of the dead are burned. They are less delicate and cleanly in their eating than the Hindoos. They kill no domestic animals, being prohibited by their religion, but make abundant use of game. The lower orders eat lizards, guanas, and snakes. They are very indulgent to the manners and customs of strangers. The sitting posture is reckoned among them the most respectful, though this mark of deference has been mistaken by some strangers for an expression of insolence.

The Pali language is that of the sacred text of Ava, Pegu, and Siam. The Birman dialect has borrowed the Sanscrit alphabet. The character in common use is a round Nagari, consisting of curves following the analogies of the square Pali. It is written from left to right, like the languages of Europe. The common books are composed of the palmyra leaf, on which the letters are engraved with stiles, and are better executed than those of the Hindoos. Sometimes they write on plates of gilded sheet iron.[a] [b] In a Birman version of the Lord's prayer, the missionaries could scarcely discover three genuine Sanscrit words; but many syllables are found coinciding with those of the colloquial dialect of the Chinese. A knowledge of letters is very generally diffused. Many read and write the vulgar tongue, though few understand the learned and sacred volumes. The Birmans are fond of poetry and music, and in the latter, make use of an instrument formed of a series of reeds, on the principle of Pan's reed.[c] They possess epic and religious poems of great celebrity, and recite in verse the exploits of their heroes. Colonel Symes was astonished at the number of books contained in the royal library, where the contents of each chest are written on the outside in letters of gold.

The Birman year is divided into twelve months of twenty-nine and thirty days alternately, and to every third year an intercalary month is added. They reckon the days of the month from the first of the moon to the full, and then in a retrograde order from the full to the next new moon.

The Birmans excel in the art of gilding. The capital maintains a considerable commercial intercourse with Yunnan, the nearest province of China. It exports cotton, amber, ivory, rubies, sapphires, and betel nuts; birds and edible nests from the Eastern Islands; and receives in return raw or manufactured silk, velvets, gold leaf, paper, sweetmeats, and a variety of hardware. By the river Irawaddy there is a great inland trade in the transport of rice, salt, and pickled sprats from the lower provinces, to supply the capital and northern districts. Some foreign articles are brought by Arracan, and carried over the mountains by men, but the greater part by the Irawaddy. Broad cloth, some hardware, coarse muslins, Cossimbazar silk handkerchiefs, china-ware, and glass, are the leading commodities. Some lac, silver, and precious stones are exported. In 1795 the quantity of timber exported to Madras and Calcutta amounted to a value of £.200,000 sterling. About 3000 tons of shipping are, in peaceable times, built in this country, and sold in different parts of India. The maritime ports of this empire are more commodiously situated than those of any other power, particularly the harbour of Negrais. The currency consists of silver bullion, and lead, in small pieces; as the Birmans, like the Chinese, have no coin.[d]

The religion of the Birmans is that of Buddha, whom they worship under the name of Gaudma, identical with the Gautama or Godama of the Hindoos. The Rhahaans, or priests, dress in yellow like the Chinese bonzes, and resemble them in many of their customs. Their *kiooms*, or convents, resemble Chinese buildings, being made of wood, with one large hall in the interior. They have no private apartments, publicity being the prevailing system, and no secrets admitted either in church or state. They profess celibacy and abstemiousness. They take only one meal daily, which is about noon. They do not dress their own food, an occupation which they reckon incompatible with the mental contemplations incumbent on them. They receive daily

[a] "Fer blanc doré," gilt tinned iron.

[b] Annal. Chinoises, quoted by Klaproth, Archives de la Litterature Orientale, I. 137.

[c] "An instrument, called *kim*, similar to Pan's reed, formed of several pipes curiously joined together, but with only one opening. Its sounds are plaintive and melancholy." M. B.—P.

[d] The Chinese have a copper coin, called Tcheng, scarcely equal to 1-3 farthing sterling. All the rest of their currency is in bullion.—P.

the contributions of the people ready dressed, generally consisting of boiled rice mixed with oil, dried and pickled fish, sweetmeats, and fruit. They prefer cold food to warm. While perambulating the town in the morning, to receive the supplies for the day, they look straight forward to the ground, never turn their eyes aside, do not solicit any thing, and scarcely look at the donors. Their superfluity is bestowed on needy strangers and poor scholars. These rhahaans, or talapoins, as they are also called, have composed many books of morality. They never interfere in political disputes; and, during the sanguinary contests of the Birmans and Peguans, were always respected by both parties, to whatever country they themselves belonged. They pay a certain respect to the Hindoo Brahmins, though they do not follow their doctrines. They have none of their pride of caste, their unnatural self-tortures, and other repulsive usages; and on the whole, Buddhism wears a more favourable aspect in this than in other countries where it is maintained. The Birmans are extremely fond of religious processions; and they place a great merit in the building of temples, neglecting, however, the keeping up of those which exist. Hence the country exhibits numerous edifices of this sort in a state of progressive decay, while new ones are erected in their immediate neighbourhood.

Their legal code is one of the commentaries on Menu. Their system provides specifically for almost every conceivable crime: it admits trial by ordeal, and imprecation. On the subject of females it is offensively minute. It is a singular fact, that the first version of Sir William Jones's translation of the institutes of Hindoo law was made into the Birman language by an Armenian, for the use of the Birman sovereign, in 1795.

In the Birman empire, the sovereign is completely despotic. When any thing belonging to him is mentioned, the epithet "golden" is attached to it. When he is said to have heard any thing, "it has reached the golden ears:" a person admitted to his presence "has been at the golden feet:" the perfume of roses is described as grateful to "the golden nose." The sovereign is sole proprietor of all the elephants in his dominions; and the privilege to keep or ride on one is only granted to men of the first rank. No honours are hereditary. All offices and dignities depend immediately on the crown. The *tsaloë*, or chain, is the badge of nobility; and superiority of rank is signified by the number of cords or of divisions. The council of state consists of the princes of the royal family. Men of rank have their barges dragged by war-boats, common water-men not being admitted into the same boat with them. Temporary houses are built for them at the places where they mean to stop in travelling.

A singularly absurd custom takes place in this country in certain forms of political homage shown to a white elephant, a preternatural animal kept for the purpose, superbly lodged near the royal palace, sumptuously dressed and fed, provided with functionaries like a second sovereign, held next in rank to the king, and superior to the queen, and made to receive presents and other tokens of respect from foreign ambassadors.

The court of Ava is fully as proud as that of Pekin. The sovereign acknowledges no equal. The punctilios of ceremony are numerous, and rigidly followed; and the utmost guardedness is observed in any diplomatic intercourse with foreign states. The manners of the great are often pleasing, but they are crafty; and the tenures by which they hold their offices render them rapacious. Obliged to give large presents to the king, they have recourse to extortion, speculations in trade, and almost universal monopoly. Great vicissitudes of fortune are occasioned by royal caprice.

Colonel Symes rated the population of the Birman dominions at seventeen millions; Captain Cox, the next ambassador, at no more than eight, and Captain Canning believed that even this estimate exceeded the truth. A country rich by nature, and capable of a high state of prosperity under tolerable management, has been wretchedly desolated by a barbarous government.

Here every man is a soldier, and liable to be called out on military duty. The only standing army consists of a few undisciplined native Christians and renegadoes from other countries, who act as artillery; a very small body of cavalry, and about 2000 miserable infantry. The armies are composed of levies raised on the spur of the occasion by the princes and lords, who hold their lands on this condition. They have never exceeded 60,000 men. The family of each soldier is responsible for his good behaviour, and the whole are put to death when he proves guilty of cowardice or desertion. The infantry are armed with muskets and sabres; the cavalry, who are all natives of Cassay, carry spears seven or eight feet long. The most respectable part of the Birman military force consists of the war-boats, which are furnished and manned by the different towns in the vicinity of the river, in numbers proportioned to their respective sizes. Formerly the king could on a short notice command 500 of these boats. They carry forty or fifty rowers, each armed with a sword and lance, about thirty soldiers with muskets, and a piece of ordnance on the prow. They make an impetuous attack, and use grapples for boarding; but lying deep in the water, they are easily run down and sunk by the impulse of another of larger size.

The king claims one tenth of all the produce, and the same amount on all imports. The revenue arising from customs is mostly taken in kind; a small part of it is converted into cash; the rest is distributed in lieu of salaries to the various departments of the court. Money is never, except on the most pressing occasions, disbursed from the royal coffers. Insatiable hoarding is here, as in other oriental countries, a standing maxim of state policy; and the riches actually in the possession of this monarch must be immense; but how heavily must the wheels of commerce move, and how low, comparatively, must the scale of national wealth and power stand, when maxims so narrow and absurd fetter every part of the machine!

By some this empire has been regarded as a formidable barrier to the progress of British ambition and cupidity in an easterly direction. The unsatisfactory nature of these extended continental possessions will probably of itself limit that ambition, especially where the field becomes comparatively new, and where farther extension does not promise to contribute to the permanent retention of present possessions, but must rather

on the contrary, expose them to new dangers. In its present state this empire is a very desirable barrier between the British and the Chinese governments, being too weak to offer serious molestation to a powerful neighbour, and too inhospitable to afford temptation to an invading army. It is now like the deserts that separate the Chinese from the Russian dominions. If this is an advantage to the repose of a great portion of the world, humanity must regret that it assumes this character, by giving rise to so large a portion of misery and desolation within itself. Yet perhaps the most sanguine political Quixote would find it a difficult task to sketch even in theory, a plan by which the Birman dominions could be put in possession of the blessings of political and civil prosperity, consistently with the maintenance of a liberal and safe line of conduct on the part of the regenerators.

In 1810 there were four Protestant missionaries in Ava, a country which, from the maxims of toleration established in it, seemed to afford a fair field for the operation of rational instruction: but the progress made seems to have been inconsiderable; and, in a government so capricious and despotic, the policy on the head of toleration may be suddenly reversed, as soon as prejudice or malice, conceived by interested individuals, may choose to represent the spread of new opinions as a ground of political alarm. The chief safety of these benevolent individuals is probably derived from the respect paid to the British power, as established in the immediate vicinity.

There is a chain of islands extending from Point Negrais, in Pegu, to the north end of the island of Sumatra, in a line parallel to the shore of the Birman peninsula, which has been considered by some as a desirable station for any enterprising European country, entertaining an ambition to open a commercial intercourse with the Birman empire.[a] This chain is divided into two groups, the Andaman and Nicobar islands.

The Andamans, on the north, are the largest group of the two. Under this name they were known to the Arabians in the ninth century. The largest island is about 140 miles long, and not more than twenty-two in its greatest breadth.[b] It is indented with deep bays, forming excellent harbours, and divided by large gulfs, one of which is navigable for small vessels, and almost crosses the island, according to the charts prior to that which Dalrymple has attached to the narrative of Col. Symes. In this last we find the island divided into three by very narrow channels. The charts of the 16th century also represent it as a long chain of small islands. The soil consists of a thick stratum of blackish earth; the rocks are a white quartz.[c] We are informed that it contains some mineral products, and, among the rest, quicksilver.[d] There are extensive forests, containing some valuable trees; such as the ebony, and the *mellori*, or bread-fruit tree of Nicobar. The only quadrupeds found here are wild hogs, monkeys, and rats. The sea abounds in fish, among which are mullet, soles, and excellent oysters.

The inhabitants of the Andamans are low in civilization, and probably cannibals. Their antipathy to strangers is singularly strong, and it must be allowed that it has been in some measure justified by atrocities committed by piratical crews. They have woolly hair, the negro countenance, and the ferocious and crafty character of the negro race. Their barbarous language resembles no dialect either of Indostan or Chin-India.[e] They seem to belong to the great negro race of Oceanica spread over New Guinea and as far as Van Diemen's land. These savages scarcely knew how to build a boat, or to manage a rope: but they have acquired a a little more civilization in consequence of an English establishment having been formed on the great Andaman, to which some criminals have been sent from Bengal.

The Nicobar islands form three small groups. The most northerly is called Car-Nicobar. Next to these are the Nicobars Proper, three in number, forming jointly a large and excellent harbour. The Sambelong islands are the most southerly. All these islands produce plenty of cocoa-nuts, areca, sugar canes, *Laurus cassia*, excellent teak wood, and sassafras of the best aromatic quality.[f] The tree called by the natives *larum*, and *mellori* by the Portuguese, bears a fruit superior to the bread fruit of Otaheité, from which it differs in botanical character. The cattle brought to them from Europe have multiplied amazingly, and the edible birds' nests, so much esteemed in China, abound both here and in the Andamans. The inhabitants are copper-coloured, with small oblique eyes. Attached to their dress is a small stripe of cloth hanging behind, which gave origin to the absurd stories of an ignorant Swedish sailor Kœping, who induced Linnæus to infer the existence of a race of men with tails. Their language and origin are little known; but they are conjectured to be of Peguan descent.[g]

The Danes are the acknowledged masters of these islands. They formed on the isle of Kamorta a small establishment which they called New Zealand, but afterwards gave it up to a Moravian fraternity. The Austrians proposed to found a colony here in 1778; but they yielded to the claims of Denmark.

To the east of these islands, and belonging to neither, though nearest to the Andamans, being at a distance of seventy miles,[h] is the picturesque volcano of Barren Island, which emits a reddish-coloured lava.

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[a] Such is the opinion of Malte-Brun, in the original.—P.

[b] "50 by 8 Fr. leagues."

[c] "Une pierre blanche quartzeuse," a white quartzy rock or white sand-stone.—P.

[d] Hamilton, II. 68. 8vo. edit. quoted by Walckenaer.

[e] Colebrook and Fontana. Asiat. Researches, vol. III. and IV. Symes's Embassy to Ava, p. 127—138.

[f] Prahl, Present State of the Nicobar Islands, ch. 17. (Copenhagen, 1804, in Danish.)

[g] Their language has a particular resemblance to that of Pegu. *Ed. Encyc.*

[h] 15 leagues E. of the Andamans. Lat. 12° 15′ N. *Ed. Encyc.*

BOOK LII.

CHIN-INDIA.

PART II.

The Kingdoms of Laos, Tonquin, Cochin-China, Cambodia, Siam, Malacca, and the Interior.

When we direct our views to the central parts of the Chin-Indian region, the lights of geography become feebler and feebler, and at last entirely desert us.

We are totally unable to fix the locality of the kingdom of Yangoma, which is governed by a Buddhist priesthood, abounds in rice, in the noble metals, in benzoin, in musk, which is exported from it to Ava, and above all, celebrated for the beauty and gallantry of its women, who are much in request with the voluptuous monarchs of the neighbouring countries. D'Anville's map places Yangoma near the sources of the western branch of the Meinam, or river of Siam. In other modern maps it is left out, as too uncertain to be admitted.

It is only by conjecture that we assign the situation of the country of Lac-Tho, which, according to a recent traveller, lies to the north of Laos, between Tonquin and China. According to this traveller, or rather the reports which he has collected, it is a table-land without rivers,[a] but of a moist soil, abounding in bamboos, and laid out in rice fields.[b] This country, which contains no towns, exports buffaloes and raw cotton,[c] in exchange for salt and silk manufactures. The people wear stuffs of cotton and of the bark of a particular tree; they labour under the unfortunate effects of a perpetual civil war, carried on among the hereditary petty chiefs to whom they are subject. Over these the king of Tonquin exercises a nominal sovereignty. Some of the Lac-Tho tribes are said to live in all the simplicity of a golden age; families possess their goods in common; the crops are left in the fields without protection; the doors of the houses are kept open day and night; strangers are welcomed, and treated with cordial hospitality; and passengers are allowed to make free use of the fruits as they go along.[d] This vague description obliges us to consider Lac-Tho as nothing else than Laos, under the Chinese appellation of Lac-Tchoo.[e] Still it may be said, that we know not for certain that this Chinese term really applies to Laos. The map of D'Anville shows that he hesitated on that point.

A traveller possessing sufficient courage and address to find his way by the interior of the Birman dominions would make interesting discoveries, by directing his course to the east through the province of Yangoma, and penetrating the almost unknown territory called the kingdom of Laos. It lies north-east from Siam, and north from Cambodia. According to received opinion, it is watered by a large river, and this is concluded to be the upper part of the river of Cambodia.[f] The Dutch envoy Wusthof went up the river in a boat, and met with great cataracts.[g] Marini agrees with that traveller, and places the sources of this river in the Chinese province of Yunnan.[h] A Portuguese traveller went from China to Laos by descending a river and crossing a lake.[i] M. de la Bissachère, in contradiction to these assertions, tells us, that in Laos there is no sort of river.[k] Perhaps these differences will be reconciled by farther discoveries. Laos is separated from all the adjoining states by high mountains and thick forests. Respecting its fertility, accounts differ. La Bissachère says that a tenth part of the land is under cultivation, and that rice is the only produce.[l] Wusthof and Marini describe it as abounding in provisions both of the animal and vegetable kingdom. The rice which it produces is esteemed the best in all these countries. Leguminous crops[m] are cultivated in great quantities. Many buffaloes are reared. For the gratification of luxury, it affords benzoin, musk, gold, and precious stones, especially rubies, topazes, and pearls. The gum lac of Laloo is above all so highly valued, that the merchants of Cambodia go thither in quest of it, although a very good article is produced in their own country. We are told that elephants are so plenty in the forests of Laos that the country derives its name from that circumstance. The greater part of the trade of this country is in the hands of the Tonquinese and Chinese. But the Siamese were once in the practice of repairing to it in caravans of many hundred carts drawn by buffaloes, making a journey of two months. Silks and salt are sold there. The latter article is said to have once brought its weight in gold.[n]

Marini says there are seven provinces, but does not give their names. Wusthof mentions three as governed by three vassal princes.

In the time of Kæmpfer, the principal towns of the

[a] La Bissachère, Etat du Tonquin, I. p. 19.
[b] Ibid. p. 246. p. 144.
[c] Ibid. p. 200. p. 75.
[d] Ibid. II. 60, 61.
[e] Lac-Tchoue.—M. B.
[f] "The same as the river of Cambodia."—M. B.
[g] Valentyn, Oud-end-Nieuw-Oostindien, IV. Description de Cambodje, p. 51.
[h] Marini, Relation du Royaume de Laos, ch. I.
[i] Jarric, Thesaurus Rerum Indicarum, I. lib. 2. ch. 25.
[k] "Ni fleuve ni rivière," i. e. neither principal river nor tributary.—P.
[l] La Bissachère, Etat du Tonquin, I. p. 147.
[m] "Legumes," this word may signify esculent vegetables in general, not including fruits and grain.—P.
[n] Valentyn, p. 53.

country were called Lant-Shang (which Marini has converted into *Langions*) and Tsiamaya: to these our modern maps add Sandepora. The Chinese told Duhalde that the word *Mohang* signified a town in the language or Laos, and that the name of the capital was Mohang-Leng. This is probably the Lant-Shang of Kæmpfer, and the capital of the province of Lantkian mentioned in the report of the Dutch envoy. But this traveller calls the capital Winkian. It was surrounded with a wall of reddish stone; had a garrison of 50,000 men, and a splendid court.

M. de la Bissachère, on the contrary, says, that Laos contains only one small town called Tranmah, containing 4000 or 5000 Tonquinese and Chinese. From this we may conclude the whole of that missionary's account of Laos to be apocryphal, or only to apply to some small corner invaded by the king of Tonquin.

The inhabitants seem to resemble the southern Chinese. Their complexions are olive. They have vigorous constitutions, a good physiognomy, and gentle and sincere dispositions; but are prone to superstition and debauchery. Hunting and fishing are almost their only occupations.

The country is divided into several small kingdoms, subject to an absolute sovereign, who, according to old accounts, shows himself in public only twice in the year, and is generally the mere tool of his priests and ministers. The heads of families are also invested with great power. The talapoins or priests, the chief of whom takes the title of *rajah*, or king, stand in no awe of the civil authority, lead licentious lives, and oppress both the people and the nobles. But we must not give implicit credit to these assertions of Marini. According to the Dutch accounts, these talapoins indulged in severe sarcasms at the expense of the missionaries. "You see," said they, "that we are in possession of a very complete system of religion; pagodas with gilded spires, pyramids, images of deities covered with gold, and regular ceremonies of devotion. We, talapoins, are a powerful, rich, and happy priesthood: before you preach to us a change of religion, condescend to learn our language, wear our dress, live among us, follow our manners, join in our studies, enter our sacred orders; and when you have made this fair trial, you shall be allowed to preach against us, and try to convert us to your faith."

M. de la Bissachère says that at present Laos acknowledges the sovereignty of the king of Tonquin.

To the east of Laos, and to the south of the Chinese provinces of Yunnan and Koansi, is the country which we call the kingdom of Tonquin,[a] bordering the gulf of the same name. Its true name is *Anam*, or *Aynam*.[b] Tonquin is the name of the capital.

The gulf of Tonquin, and the adjacent seas, are remarkable for dreadful whirlwinds, called *typhons*. After calm weather, they are announced by a small black cloud in the north-east part of the horizon, with a copper-coloured margin, which gradually brightens till it becomes white and brilliant. This alarming appearance often precedes the hurricane twelve hours. These dreadful winds seem to arise from the mutual opposition of the north wind coming down from the mountains of the continent, and the south wind proceeding from the ocean. Nothing can exceed their fury. They are accompanied with dreadful thunder, lightning, and heavy rain. After five or six hours a calm succeeds; but the hurricane soon returns in the opposite direction, with additional fury, and continues for an equal interval.[c]

According to the accounts of the missionaries, the climate of Tonquin is constantly refreshed by the south and north winds. Rain falls from April to August, and is followed by a beautiful and abundant vegetation. On the north and west the country is skirted by mountains. The centre and sea coast present one extensive plain, which seems to owe its origin, at least in part, to the alluvial depositions of the ocean and the rivers.[d] These low lands are protected from the encroachments of the sea by numerous and extensive embankments, and are very productive in rice. In several places the sand and mud form a thin half fluid mixture with the sea water, where the Tonquinese glide along in a half sitting attitude on planks, engaged in fishing. From May to September the rivers overflow their banks. The principal river is the Sang-Koi, called in China, where it rises, the Hotikiang. It receives the Li-Sien.

The Tonquinese cultivate sweet potatoes, yams, plantains, rice, mangoes, lemons, cocoa-nuts, and pine-apples. They have excellent silk. The Tonquin oranges are the best in the world. The tea tree grows in great plenty, but it is not applied to use. Iron-wood, and several other valuable trees, grow on the mountains, while the *areca* palm, or betel nut tree, the *Piper betle* or betel leaf vine, indigo, and sugar canes, enrich the plains. Sheep and asses are here unknown. The forests are peopled with tigers, deer, antelopes, and monkeys, and the fields are covered with cattle, buffaloes, hogs, and poultry.

The natural history of this country consists of vague notices, furnished by ill informed missionaries. When they boast of the wild bees, which, like those of Brazil, furnish a limpid and fragrant honey; when they complain of the devastations of the white ant; or of the swarms of serpents which infest this marshy country, we recognise the stamp of truth in their artless descriptions. But, when they tell us that they saw monkeys which sung with all the melody of the nightingale,[e] we must suspect at least an illusion of imagination or of memory.

The mineral kingdom presents iron in a very pure state, abundance of good copper, some tin, and gold, and a metal which, from the qualities ascribed to it, appears to be zinc in the state of muriate or arseniate.[f] The numerous caverns filled with stalactites indicate the calcareous nature of many of the mountains.

The capital of Anam is called Dong-Kin, or "the Court of the East," which we have converted into Tonquin. It has now taken the official name of Bac-Kin, or "the Court of the North," but is commonly known by the people under the name of Kescho. It

[a] "Tunkin."
[b] Valentyn, Lettre d'un roi de Tonquin à un gouverneur de Batavia. (Letter of a king of Tonquin to a governor of Batavia.)
[c] Pennant's Outlines of the Globe, III. p. 76.
[d] La Bissachère, Etat du Tonquin, I. p. 46, &c.
[e] La Bissachère, I. p. 94.
[f] Ibid. I. p. 53.

stands on the river Sang-Koï, 110 miles[a] from the sea, and is said to equal Paris in size,[b] though it only contains 40,000 inhabitants,[c] a great proportion of the ground being taken up with wide streets, cottages, and gardens. The palaces of the king and mandarins are the only buildings formed of so durable a material as sun-dried brick, and those of the sovereign are distinguished by the form of squares. Besides the capital, there are the cities of Han-Vints of 20,000 inhabitants; Tranash of 15,000; Kausang of 8000; Hun-Nam of 5000; the last being the same with Hean, where the Dutch had their factory. In the cultivated part of the country the villages are close together, and the highway presents an uninterrupted succession of houses and gardens planted with palms. Of the provinces, we shall only particularize Boschin, on the Chinese[d] boundary.

Tonquin, separated from China in 1368, preserved those forms of patriarchal despotism which distinguish the great nations of Asia. Rank, honours, and wealth, are concentrated in the mandarins, literary and military. The "king's men"[e] form a race superior to the rest of the nation. The dynasty of Lé governed for many ages with all the wisdom and all the benignity that despotism can admit of. But one of the great officers of the crown, the Shooa or Shuavua,[f] a sort of mayor of the palace, having become hereditary, and placed himself at the head of the army and of the principal revenues, soon reduced the *bova* or king to the mere shadow of a monarch. Cochin-China was separated, and it formed, under the dynasty of N'guyen, a kingdom first tributary to Tonquin and afterwards its rival. The civil wars which broke out about the middle of last century, on the succession of a Shooa, gave the king an opportunity of resuming the supreme power. With a view to revive his claims to Cochin-China, he interfered in the internal revolutions of that country, and, with warm though interested zeal, attacked the usurpers of the throne of N'guyen. One of these usurpers in revenge invaded Tonquin, where he exterminated the house of Lé, and established himself in the sovereignty, retaining also that of the greater part of Cochin-China. The rightful heir of the latter, however, succeeded, by dint of perseverance, in re-conquering his kingdom; and, pursuing the usurpers into the heart of Tonquin, made himself master of that country, which he kept, under the pretext that the house of Lé was extinct. Thus, this prince, Ong-N'guyen-Shoong, the Shang-Shong[g] of some authors, now reigns over all the ancient kingdom of Anam, to which he has added Lac-Tho, Laos, and Cambodia. But the national hatred of the Tonquinese against the Cochin-Chinese; the insubordination of Laos and other parts of the interior; the supposed existence of an heir to the house of Lé; and the death of the princes who were the immediate heirs of the throne of N'guyen-Shoong, are circumstances which compel us to regard the Annamitic empire as a mere passing meteor.

The Tonquinese have flat and oval countenances, lighter complexions than the other Indian nations, and black, long, and thick hair. Their whole dress consists of a robe which reaches to their heels. Their monosyllabic language is derived from the Chinese, from which, however, it is distinguished by the possession of a number of compound words, and by aspirate and hissing sounds, which are wanting in the Chinese.[h] The Tonquinese have also changed the Chinese written character, or perhaps they have preserved one which has gone into disuse in China. Their literature is supposed to be rich in works of eloquence. For six centuries they have committed the history of their country to writing. Though less refined than the Chinese, this nation seems to possess a greater degree of moral vigour. They have exhibited an impetuous bravery, and their history records some splendid instances of heroism and generosity. They are described as hospitable, faithful in friendship, and entertaining great respect for civil justice;[i] yet are accused of vanity, fickleness, dissimulation, and revenge.[k] Living under an absolute despotism, the Tonquinese have probably few virtues and few vices but what are common to them with their neighbours. Their army, which amounts to more than 100,000 men, often beats the Chinese. Their navy, consisting of 200 galleys, is remarkable for nothing, except the employment of a sort of Greek fire which burns under water.[l]

Here, as in China, the monarch annually celebrates a festival in honour of agriculture. Polygamy exists in all its latitude. No woman claims the rights generally attached to matrimony, and they are discarded by the men at pleasure. The marriages are made without priests, but the consent of parents is essential. Barrenness is here a great reflection on any family, but the mixture of many children of different mothers occasions no inconvenience.[m] The pomp of the burials, the elegance of the coffins, the superstitious selection of particular situations for graves, and the festivals in honour of ancestors; every thing, in short, reminds us of the funeral solemnities of the Chinese. They are fond of scenic representations of the comic sort, dances, and cocking matches. They have also among them some dramas of a tragic nature.

The Tonquinese succeed in the manufacture of silk and cotton goods, muskets, porcelain, Chinese paper, varnished furniture, and hardware. Their foreign trade consists of silks of all sorts, printed calicoes, earthen vessels, medicinal drugs, musk, ginger, salt, dye-woods, aloes-wood, marble, alabaster, and varnished wares.[n] They keep up a great commercial correspondence with China. The Portuguese and Dutch, who attempted to form some commercial relations with Tonquin, were obliged to give them up; nor have the French been more fortunate. Since these attempts, their only connexion with Europeans has consisted of some visits made by the English merchants of Madras, who have not followed up that intercourse with any steadiness.

[a] "40 Fr. leagues."
[b] Richard, Hist. du Tonquin, I. p. 36.
[c] La Bissachère, I. 73.
[d] "Cochin-Chinese."
[e] "Gens du roi."
[f] Chova, *Pinkerton*.
[g] "Chaung-Choung."—M. B. Cauag-Shung.—*Ed. Encyc.*
[h] Alex. Rhodes, Dictionarium Anamiticum. Roma, 1653. Hervas, Saggio Pratico, p. 134. Valentyn, Descript. du Tunkin, p. 6.
[i] La Bissachère, II. p. 36, &c.
[k] Marini, Relation du Tonquin, p. 64–66, &c. (trad. Franç.)
[l] La Bissachère, I. 325.
[m] Marini, p. 155.
[n] Valentyn, p. 5, p. 31, &c.

The Jesuit missionaries were completely expelled in 1772.

To the south of Tonquin we find COCHIN-CHINA, the geography of which has been rendered obscure by the number of contradictory authors who have treated of it. This country, which was included along with Tonquin under the general name of Anam, was separated from it 600 years ago. It is uncertain under what name it was particularly designated, or is now by its own inhabitants. That of *Anam* is too extensive. That of *Quinam*, mentioned as the name of the kingdom by a good observer,[a] seems to belong only to the principal province.[b] The Japanese call the country to the west of China, Cotchin-Djina, and the Europeans have followed them. But a new question rises here. What are the limits of that country? The nature of the territory, and the limits occupied by a particular nation, have made the Europeans confine their application of the name of Cochin-China, or *Southern Anam*, to the coast lying between Tonquin and Tsiompa, 300 miles in length, and varying from thirty to seventy in breadth.[c] We shall not deviate from this convenient application of the term. If recent, and perhaps temporary conquests, have subjected the coasts of Cambodia to the king of Cochin-China, the name may still be employed with propriety to distinguish a nation which, as well as their country, is essentially different from the other. The geography of the provinces is still less satisfactory. Those who follow some modern travellers, in extending Cochin-China to the Cape of Cambodia, divide it into three parts—the *high*, the *middle*, and the *low*;[d] or (to use the native names) the province of *Hué*; that of *Shang*, which is said to reach from the 12th to the 16th degree of latitude; and that of *Donnaï*, which is identical with lower Cambodia. The earlier travellers give Cochin-China properly so called, a much more complicated, yet probably a more correct, though obscure division; in which we have attempted to fix the following provinces, proceeding from north to south.

Hué, Hoé,[e] or Toan Hoa,[f] separated from Tonquin by a narrow defile, which is closed up by a wall, contains a large city, with a royal fortified castle, the ordinary residence of the reigning monarch. This city, with a population of 30,000 souls, bears the name of Ke-Hoa in the popular dialect, and of Foo-Shooang in the language of the mandarins. The province of Quambin is in the mountains.

That of Shang,[g] (or, in the Portuguese orthography, Ciam,[h]) less extensive by two thirds than modern accounts represent it, contains the magnificent bay of Turon, frequented by the junks of the Chinese and other nations, surrounded by a picturesque and fruitful country, and receiving the waters of a river on which is situated the city of Tai-Foo, the centre of the commerce of Cochin-China.[i] It was in the mountains to the south-west of Tai-Foo that the Dutch travellers met with the province or tributary principality of Tiam or Thiem, removed by D'Anville 160 miles[k] to the north-west, because this geographer was not aware that Laos, from which Thiem has been disjoined, extends a great way south, between Cambodia and Cochin-China, coming almost in contact with Tsiompa.[l] On the sea shore we find the province of Quan-hia (or Quan-sia) with the city of Banbong. Next comes the rich and fine province of Quinam, or Quin-Nong,[m] with the city of the same name, containing 10,000 souls, and situated on the bay of Shin-shen. This is the ancient capital of the whole kingdom. The province Foy of the Dutch is called Phayn by the missionaries. In that of Niaron we find the city of Din-Foan, probably the same with Qui-Foo, mentioned as a large town by a modern traveller.[n] The province of Niatlang forms the southern extremity of Cochin-China. Raman, which D'Anville substitutes for this province, is merely a country town;[o] and the two districts of Dingoë and Dihheut belong to the province of Hué.

There is no shore that suffers more perceptible encroachments from the sea than that of Cochin-China. M. Poivre found that, from 1744 to 1749, the sea had gained 190 feet[p] from east to west. The rocks in the southern provinces are in unstratified masses, generally granite, and sometimes with perpendicular fissures.[q] In the middle of the river of Hué-Hane, three miles up,[r] there is an island of sand, from the centre of which rises a large and magnificent alabaster rock, which in several places is perforated quite across. It has got the name of the "Hill of Apes."[s] The coast generally presents sandy shores. In such places the anchoring ground extends a great way out, and consists of a miry sand mixed with shells. In some parts the beach is strewed with rounded pebbles. Opposite to such places the anchorage is rocky and bad. In those situations in which the shores are mountainous and steep there are no soundings. It is opposite to the sandy parts that reefs of madrepores and coral are found in spots separated from one another by short distances.

Nature has divided this country into two distinct portions, the plain and the mountains. These last enjoy a steady temperate climate; but to strangers they prove unhealthy, which has been supposed to be owing to an impregnation which the waters derive from decayed leaves and minerals. In these live the savage tribes called *Moys* or *Kemoys*, who worship the sun, and employ magical charms to preserve their rice fields from the depredations of elephants. They abound in tigers and monkeys. They contain some iron mines, which are worked. A very pure gold is also found there, and silver has lately been discovered. The principal riches of the mountains are their forests, which pro-

[a] Wusthof, in Valentyn, IV. Description de Cambodia, p. 52, 53.
[b] Alex. de Rhodes, Relation du Tunkin, au comm.
[c] "110 by 10 to 25 Fr. leagues."
[d] La Bissachère, I. p. 25. Barrow's Voyage to Cochin-China.
[e] Valentyn, Descript. du Tunkin, IV. p. 2.
[f] Alex. de Rhodes, l. c.
[g] "Chang."
[h] D'Anville's Map of Asia. Valentyn, l. c. (The *Cham* of Rhodes.)
[i] Barrow's Voyage.
[k] "60 Fr. leagues."
[l] Wusthof, in Valentyn, Descript. de Cambodia, p. 53.
[m] The Quenia of Father Rhodes.
[n] La Bissachère, I.
[o] "Bourgade."
[p] "More than 30 toises."
[q] "The rocks in the southern provinces, are unstratified masses, (masses de roc vif, sans couches horizontales;) some of them, which are divided by perpendicular fissures, are granitic." M. B.—P.
[r] "A league from the bay."
[s] "Montagne des Singes."

duce rose-wood, iron-wood, ebony, sappan, sandal-wood, eagle-wood, and calambac—the last of which sells in China for its weight in gold.[a] Biuh-Kiang is the place most favourable to the growth of the beautiful tree called *Aloëxylum verum*, from which is obtained the resinous aromatic concretion called calambac, or in Cochin-Chinese *kinam*. Paper is made of the bark of the same tree.[b] The common eagle-wood (*bois d'aigle*) is the produce of the *Agallochum*. Other valuable substances are found here, such as gum lac, elaborated by insects on the *Croton lacciferum*, and the *sanguis draconis*, or dragon's blood, obtained from various trees, the chief of which is the *Dracæna ferrea*; the tallow tree, or *Sebifera glutinosa* of Loureiro, has been already mentioned.[c]

The plain is exposed to an insupportable degree of heat in the months of June, July, and August, except in the places which are refreshed by the sea breezes. In September, October, and November, the plentiful rains, which fall exclusively in the mountains, swell the numberless rivers with which the country is intersected: in an instant all the plain is inundated, the villages, and even the houses, are so many islets. Boats are navigated over the fields and hedges, and the children in small barks go out to fish for the mice, which cling to the branches of the trees. This is the season of inland commerce, large fairs, and popular festivals; but the cattle are sometimes drowned, and are picked up by the first who finds them. In the months of December, January, and February, the north wind brings with it cold rains, which are the only symptoms of winter. This plain produces an immense quantity of rice, of which there is a double harvest, and which sells at less than a penny per pound; also maize, millet, several kinds of beans, and pumpkins; all the fruits of India and China, a great quantity of sugar canes, the juice of which, purified and formed into cakes, is exported to China,[d] particularly from the province of Shang,[e] areca nuts, betel leaf, cotton, silk of good quality, tobacco, and indigo. The *Laurus myrrha*[f] gives a kind of cinnamon which, for its camphorated odour and saccharine flavour, is preferred among the Chinese to the cinnamon of Ceylon.[g] The tea of Cochin-China would be excellent, if the culture[h] of it were more attended to. The plant called *dinaxang*, or green indigo, would of itself enrich any colony. The Cochin-Chinese have a small breed of horses; mules, asses, goats, and plenty of poultry. Thy derive a good aliment from *Salicorniæ*, *Arenariæ*, and other saline plants, and from different species of *Ulvæ* and *Fuci*, thrown out upon their shores. The sea affords them fish, different species of mollusca, particularly *Holothuriæ* or *Bichos-do-mar*, which are greedily eaten by all the nations of the south-east of Asia. The islands of Cochin-China abound as much as any part of the eastern regions in the nests of the salangan swallow, or *hirundo esculenta*, which are so much in request among the epicures of China.

This country, where so many interesting articles of produce attract the commerce of Europe, is peopled by one of the most active and lively nations of Asia. Their small figures and dark olive complexions give them no high place in the sca of beauty. The common people follow the religion of Buddha the mandarins study the writings of Confucius. The Catholic faith had made some progress, and the rising church, even in a political point of view, claimed the protecting care of the European powers: but now, the death of the prince, who was a pupil of bishop Adran, has left it without support in the midst of perils and of obstacles. Had the principles of that communion, and the governments which are under their influence, been more conspicuous for affording that generous tolerance of which they so greedily avail themselves when they take up their residence in other countries, they would be entitled to more sympathy under their difficulties than many readers will be inclined to give them. The vulgar tongue, though a dialect of the Chinese, is not understood in China. The written characters are nearly the same; but they are acquainted with only a small number of them.[i]—Persons of condition dress in silk. In manners they display all the politeness of the Chinese. The costume of both sexes consists of flowing robes with wide sleeves, under which are vests and trowsers of cotton. The men wear a sort of turban on the head, and use no shoes or slippers. Their houses are built of bamboo, and roofed with reeds and rice straw. They are generally surrounded with groves of orange and lemon trees, bananas, and cocoas. The Cochin-Chinese manufacture a spirituous liquor from rice, for their own use. They are tolerably skilful in the manufacture of hardware, and their pottery and stone wares are handsome. In music they have made some progress. Lord Macartney, during his stay at Turon, witnessed a sort of historic opera, containing recitatives, airs, and choruses. Their ships are elegantly formed, the largest being about sixty tons burden. The form of their sails is admirably adapted for going near the wind, being constructed on the principles of a fan, which is opened and shut in a moment. The rowers move in time to the notes of a lively song. The ceremonies and festivals proclaim the Chinese origin of the nation. When the sovereign dies, they bury him in profound silence, for fear of conveying the important intelligence to genii hostile to the empire, who might seize on such a moment to visit it with new disasters.[k]

We have already mentioned that Cochin-China formed in ancient times one state with Tonquin. But a rebellious governor afterwards erected here an independent kingdom. His successors subdued Tsiompa and Cambodia. But, enervated by the enjoyments attached to despotism, the princes of the dynasty of N'guyen allowed their favourites and ministers to oppress the people; and becoming in a little time the puppets of their slavish courtiers, they held the sceptre on a most precarious tenure. The Tonquinese interfered in the troubles with which Cochin-China was agitated. Disdaining a foreign yoke, the three brothers, *Tay-Son*, employed their influence to raise an army: from deliverers

[a] Charpentier-Cossigny, mémoire inédit, cité par M. Blancard, Commerce des Indes et de la Chine, p. 344, &c.
[b] Loureiro, Memorias da Academ. das Sciencias da Lisboa, II. 205—213. Valentyn, and the notes on Barrow, in the French translation, written by the author of this work.
[c] See page 536.
[d] Barrow.
[e] Charpentier-Cossigny, loc. cit. p. 370.
[f] Loureiro, Memorias, I. 385.
[g] Blancard, loc. cit. p. 374.
[h] "Recolte," gathering.
[i] Adelung, Mithridates, I. p. 90
[k] Kœffler, Historica Cochin-Chinæ Descriptio, p. 72—76.

they became usurpers, and took possession of the kingdom. One of these rebels also achieved the conquest of Tonquin. He died in 1792, and his extensive dominions were divided among his sons. The lawful prince, taking refuge with the king of Siam, endeavoured to form a party in the southern portion of the kingdom. Bishop Adran, who, from being a missionary, had become vicar apostolic and prime minister[a] to the rightful sovereign of Cochin-China, craved assistance from France. He brought over to that country the heir of the crown, whom he had secretly converted, without venturing to baptize him. France seized this opportunity to establish her influence and her commerce in one of the richest countries of India, but was prevented from following up that object by the events of her own revolution. The bishop and young prince returned, attended by a small number of French, but the boldness and perseverance of N'guyen-Shoong at last conciliated the smiles of fortune. The dissensions which reigned in the family of Tay-Son aided him in recovering the inheritance of his fathers. To these he added Tonquin, and he now reigns over all the Chin-Indian countries to the east of the kingdom of Siam. An intrepid warrior by land and sea, he gained admiration for his talents, his correct manners, his humanity, and a generosity unknown to Asiatics. These virtues were partly the fruits of the education given to him by bishop Adran, and partly the effect of the events of his life. When arrived at the summit of prosperity, he showed himself to be less worthy; and, as we have already remarked, the death of his heirs, and the discontent of the Tonquinese, portended no long duration to the Anamitic empire.[b]

The form of government has always been despotic. The sovereign is styled "the king of heaven." His army is from 100,000 to 150,000 strong, among whom are 30,000 armed with muskets, and trained to the European exercise. The soldiers carry sabres and pikes of enormous length. No elephants are now employed in war. A Portuguese, who was shipwrecked on the coast of Cochin-China, cast some pieces of brass ordnance, which are still in existence. Some Frenchmen, among whom was M. Ollivier, have assisted the present king in the formation of a respectable navy. He has himself, like Peter the Great, studied the art of shipbuilding, by causing a European vessel to be taken to pieces under his eyes. This prince has been seen directing the manœuvres of 1200 galleys, a hundred of which carried from sixteen to twenty-four guns. But when he got the better of all his enemies, he allowed this branch of his force, which is so essential and so well adapted to the local situation of his dominions, to fall into neglect.

The kingdom of Tsiompa[c] is more the country of tigers and elephants than of men. Its real name is said to be *Bin-Tuam*.[d] For five or six months of the year the climate is unhealthy; the heats are excessive, the water is bad, and all provisions except fish are scarce. The soil is sandy and poor, but it produces cotton, indigo, and an inferior sort of silk.[e] The inhabitants are called Loyes, and seem to be of the same stock with the Laos, or Lows, and the Lolos of Yunan. They are large, well made, and muscular; their complexions ruddy; their noses rather flat; and their hair long and black.

Donnaï, properly so called, seems to be a district between Tsiompa and the mouths of the river of Cambodia. On an arm of that large, fine, and deep river, is the city of Saigong, which was for some time the naval arsenal of the king of Cochin-China.[f] In approaching that city, we sail forty miles up a river one or two miles broad, and so deep, that large vessels graze the verdant banks, while their rigging is liable to get entangled in the branches of the lofty trees by which it is shaded,[gh] Cape Saint-Jacques, at the mouth of the river, forms a tolerably good roadstead.

The Pracel or Paracels, is a labyrinth of islets, rocks, and shallows,[i] which, according to the most approved charts, extend in a line parallel to the coast of Cochin-China, between north latitude 10° 45′ and 16° 30′, the mean longitude being about 109° east.[k] But some French navigators have crossed a part of this space without encountering any rocks or shallows, whence we must conclude that this archipelago is in reality less extensive than it appears in our maps.[l]

The island called Pulo-Condor, or "the Island[m] of Calabashes," is situated south from Cochin-China, forty-four miles[n] from the mouth of the river of Cambodia. It is, properly speaking, a group of islands, among which is a harbour capable of holding eight ships, and a good and extensive anchorage. Here vessels bound to China purchase provisions, especially buffaloes, which sometimes weigh seven quintals, and Chinese pigs. It produces rice and several fruits, especially bananas, shaddocks, and calabashes. It is a place well adapted for a military and commercial station.

Of the kingdom of Cambodia[o] we have few authentic accounts, and none of modern date. The Portuguese call it Comboja, (pronounced Cambokha.) A letter of one of its kings, in a Dutch translation, has it *Camboetsja*, (pronounced *Cambootja*.[pq]) This also is the orthography of the Malay authors.[r]

This country seems to consist of three physical regions: the valley watered and inundated by the Mey-Kon, including some large islands at its mouth;[s] the deserts, which probably begin on the borders of the

[a] Plenipotentiary from the Court of France.—P.
[b] La Bissachère, Barrow, &c.
[c] "Tchiampa, Ciampa," Chiampa.
[d] Rosily, Carte du Dépôt de la Marine, and the article *Aynan* in the "Dictionnaire de Géographie Maritime," by M. de Grand-Prè.
[e] La Bissachère, 1. p. 16. Barrow's Voyage to Cochin-China, where it is written Fen-Tan.
[f] Rosily, cite par Blancard, Commerce des Indes, p. 361.
[g] Barrow's Voyage.
[h] Saigon was visited in 1820 by Lieut. White, of the American navy. According to his statements, it is situated on the river Donnaï, 60 miles from its mouth, and has a population of 180,000. This estimate was given him by the viceroy and a missionary, and like all native accounts, is probably exaggerated. The houses are mostly of wood and thatched.—P.
[i] "Haut fonds," properly a shoal near the surface, such as large vessels cannot pass with safety, in distinction from "bas-fonds," deep water with soundings.—P.
[k] 107° E. of Paris; 109° 20′ 15″ E. of Greenwich.
[l] Rosily, Carte du Dépôt de la Marine, and the article *Aynan* in the "Dictionnaire de Géographie Maritime," by M. de Grand-Prè.
[m] *Pulo* island. [n] "16 Fr. leagues."
[o] "Improperly written *Camboge*."—M. B.
[p] Properly, *Camboetsya* or *Camboetzha*. —P.
[q] Valentyn, Description de Cambodia, p. 48. [r] Ibid. p. 36. Hagenaar, in the Voyages of the Dutch Company, V. p. 360

inundated territory, and extend a great way to the east; and lastly, the sea coast, generally low, sandy, covered with under-wood, and washed by a very shallow sea.[a]

The river of Cambodia falls into the sea by three mouths; that of Saigong, already mentioned, and which, according to the missionaries, is more particularly called the river of Cambodia;[b] one called the Japanese river, from being frequented by the junks of Japan; and a third, which the Dutch have called *Onbequame*, or "the Inconvenient."[c] The second of these branches also receives the name of the Bassak, and the third, that of the Matsiam.[d] The tides extend a great way up this river. It is said that a great lake or inland sea is connected with these mouths.[e] The inundations take place in June. The beds of the two western branches are full of low islands and sand banks, which render them unfit for being navigated by large vessels.

The country is indifferently peopled. The capital, which we call Cambodia,[f] but the true name of which is Eeuvok, consists of a single street, with one large temple. The chief production of the country is the well known yellow pigment called gamboge, which is also used in medicine as a drastic purgative. It produces considerable quantities of ivory, rose-wood, sandal-wood, eagle-wood, and calambac. The teak, iron-wood, and *calophyllum*, which grows as straight as the Norwegian pine, might supply ample materials for ship building. A little tin and gold are exported. The fields produce rice and other vegetable food. Many Japanese, Chinese, and Malays, are settled in the country. These last are scarcely distinguishable from the natives, who have dark yellow complexions, and long black hair.

A Dutch traveller, ascending the river to the north of Cambodia, passed the towns of Batjong, an ancient seat of royalty, and Sumbapoor, the residence of a high priest, who assumes the title of rajah, and exacts a toll from passengers.[g] M. Poivre observes that a short way from the capital are to be seen the ruins of an ancient city, the architecture of which shows something of the European style, while the ridges in the adjoining fields indicate that they have been under tillage. The present inhabitants have no sort of tradition respecting this ancient establishment.

Ponthiamas,[h] a small independent state, was founded in 1705 by a Chinese merchant of the name of Kiang-Si. This state prospered under a flourishing trade. Its capital, which receives the same name, is situated on the west coast of Cambodia, which had previously been almost a desert.

A wide and deep gulf divides the southern part of Chin-India into two peninsulas. At the bottom of that gulf we find the famous kingdom of Siam, from which the gulf derives its name. The name which the Siamese give themselves is *Tai*, or "Free Men." Siam is a name of Malay origin. Previously to the recent enlargement of the Birman empire, the rich and flourishing monarchy of Siam was considered as the leading state of India beyond the Ganges. Its extent, however, has been curtailed by the Birman invasions, and cannot at present be fixed with accuracy. It is probable that a part of the coast south from Tenasserim, on the west side of the peninsula of Malacca, still belongs to Siam. It is separated from Pegu on the west by a chain of mountains; on the east another chain, little known separates it from Laos and Cambodia. Thus the kingdom of Siam may be considered as a wide valley between two chains of mountains.

The Siamese Nile, or Meinam, holds a high rank among the rivers of eastern Asia. Kæmpfer describes it as very deep, rapid, always filled to its banks, and larger than the Elbe. He adds, that the inhabitants suppose it to rise in the same mountains with the Ganges, and describe it as dividing and sending branches through the kingdoms of Cambodia and Pegu; accounts which, though fabulous, include perhaps some disfigured truths. The inundation takes place in September In December the waters decline. The springs (sources) rise before the inundation of the river commences, and the well-water is nitrous. The water of the Meinam, though muddy, is agreeable and wholesome; the inundation is most remarkable in the centre of the kingdom, and much less so in the neighbourhood of the sea. The operations of the rice harvest are conducted in a great measure in boats. The soil of the mountains is dry and barren; but the river banks consist of a rich and deep alluvial soil, where scarcely a single stone or pebble is to be found. The banks of the Meinam are low and marshy, but exceedingly populous from Yuthia to Bankok. Lower down they are mere deserts, swarming with monkeys, phosphoric flies, and mosquitoes. The Siamese year is, with respects weather, divided into three parts. The two first months, December and January, form the winter, during which the north wind prevails: it is a dry season, but almost as warm as the summer is in France. The third, fourth, and fifth months, are called by the Siamese their little summer; the great summer consists of the other seven. The weather in summer is moist.[i]

The immense forests which border the valley of the Meinam contain some valuable kinds of wood, which are vaguely mentioned by the missionaries. The bark of the *tonki* tree is used for making paper. The wood of the *faang* tree forms a good red dye. They have three varieties of rice; wild rice, mountain rice, and that of the plain. Among the different kinds of cotton, there is one too fine to admit of being spun. The lands which are so situated as not to admit of inundation are under corn crops. Pease, and other leguminous species, are abundant; maize is cultivated only in the gardens.

The animal species of Siam are common to it with the whole of the neighbouring countries. Its elephants are celebrated for their beauty and docility. The white ones are held in veneration, because the Siamese

[a] Chapman, Annales des Voyages, VII. p. 15.
[b] Valentyn, ibid. 37, 33.
[c] "Incommode;" more properly "the unsuitable," from its being ill adapted to navigation.—P.
[d] Relation des Vicares Apostol. I. ch. 1. p. 8.
[e] "They receive, it is said, the waters of a great lake or inland sea."—M. B.
[f] "Camboge."
[g] Wusthof, in Valentyn, p. 51, 54.
[h] Cancar, Cancao.
[i] Loubère tome I. p. 53

believe that the souls of their deceased sovereigns pass into their bodies. The horses are bad, and the cattle scarce. There is here a small sort of panther of the size of a dog, which only attacks poultry. Wild boars and monkeys are in great abundance. The birds and insects of this country are remarkable for their huge size. The *nocto* is larger than an ostrich. All travellers speak in terms of admiration of certain birds, the species of which are not determined, whose tufts of white or red feathers enliven, like so many brilliant flowers, the verdure of the woods.[a] The Meinam is sometimes infested with venomous serpents. The trees on its banks are covered with phosphoric flies, which emit and retain light with all the regularity of a revolving machine. But the fine objects which this scene presents never banish from the traveller's mind the recollection of the numerous crocodiles with which the river abounds, which are sometimes fifty feet in length.

The principal mines of Siam are those of tin and copper, the last of which is sometimes mixed with a little gold. Antimony and lead are also exported. The country produces beautiful marbles, loadstones, agates, and sapphires.

The topography of a country, the interior of which has not been traversed by any European, is, of course, very defective. The capital is called by the natives *Siyuthia*, or simply *Crumg*, *i. e.* "the court." The Portuguese have changed the name Siyuthia into *Juthya* and *Odia*. This town embraces a large territory occupied with cottages and gardens. But the view given of it by Loubère must be somewhat modified. Father Gervaise tells us that the foreigners' quarter is full of brick houses; and that the part occupied by the natives contains handsome paved streets.[b] The judicious traveller Kæmpfer expressly says, that "the temples are more elegant than the churches are in Germany. The Puka-Thon is a pyramid in a plain to the north-west of the city, in memory of a famous victory gained over the king of Pegu. Its height is 120 feet, and the building massive but elegant. In the eastern part of the city are two squares, surrounded with walls, and separated by a canal. They contain monasteries, colonnades, and temples, the most conpicuous being the temple of Berklam, with a large and splendid porch, ornamented with statues, sculptures, and other decorations."

Louvok, a populous town on the great river, frequently shares with Siyuthia the honour of being the residence of the court. This is probably the Loeach of Marco Polo: he arrived there from Pulo-Condor by sailing along the eastern shore of the gulf of Siam, and, leaving Louvok, he directed his course along the western shore of the gulf to Petani or Patan. An explanation so natural would have occurred to all his commentators, if they had not found the name written in several editions *Boeach*. Near the mouth of the river we find Bankok, called in the country *Fou*. This is the key of Siam, in the direction of the sea. Its environs are embellished with delightful gardens. Above the capital we find Porseloue, the chief town of an ancient principality of the same name, famous for its dye-woods and valuable gums.[c] Cambouri, on the frontier of Pegu, is the seat of a great commerce in eagle-wood, ivory, and rhinoceros horns. From this place comes the finest varnish.

That part of the kingdom of Siam which lies on the Bay of Bengal, is an ancient conquest of the Siamese from the kings of Pegu. Here the Birman language is spoken.[d] The Birmans have reconquered Tenasserim, with its port Mergui, and the island of Junkseylon; places which have, on that account, been already described.[e] But the Siamese still retain the kingdom of Ligor on that coast,[f] a country which yields a very pure tin called *calin*.[g]

In physical qualities the Siamese resemble the Mongolian race. Their faces are of a square form,[h] with wide and prominent cheek bones; so that the cheeks themselves appear somewhat hollow. The forehead is narrow, terminating in a point almost like the chin. Their eyes are small, rather dull, and rise towards the temples. The white of the eye is exceedingly yellow. The width of their mouths, and the thickness and paleness of their lips, give them a singularly ugly aspect. They are in the practice of blackening their teeth, and partially covering them with gold plates. Their complexions are olive, with a mixture of red. Kæmpfer compares them to negroes, and even to monkeys.[i] Their monosyllabic language has not been carefully examined. The Siamese alphabet contains thirty-seven consonants; and the vowels form a distinct list. It contains the letters R and W, the former of which is unknown to the Chinese. The pronunciation, as in other ancient languages, is a sort of chant. Neither nouns nor verbs have inflection.[k] The sacred books, like those of the Birmins, are in the Pali language.

The manners of the Siamese resemble partly those of Indostan, and partly those of China. Polygamy is allowed. The princes sometimes marry their own sisters. The wife, humble and submissive, neither presumes to sit nor to eat with her husband: vigilant and attentive in the preparation of his food, she does not eat till he has finished. She never goes out in the same boat with him, and even when lying on one common bed, she has a lower pillow to mark her inferiority.

Their funerals bear a great resemblance to those of the Chinese. The talapoins, or monks, chant hymns in the Pali language. When the solemn procession is ended, the body is burned on a pile of valuable fragrant wood. The tombs are in the form of pyramids, and those of the kings are of large dimensions both in height and breadth.

The Siamese are fond of dramatic exhibitions, founded on their sacred mythology, and the fabulous history of their heroes. They have bull races, aquatic boat-fights, combats of elephants, cock-fightings, contests of human strength, wrestling matches, rope dances, religious processions, illuminations, and beautiful fire-works.

[a] Choisy, Voyage à Siam, 1741, in 2mo. p. 229. Voyage de Siam des pères Jesuites, 1686, 4to. p. 201.
[b] Gervaise, Hist. de Siam, p. 41.
[c] Turpin, Hist. de Siam, I. p. 23
[d] Gervaise, p. 11, &c.
[e] See page 541—2.
[f] Opposite the island of Junkseylon, on the isthmus which connects the peninsula of Malacca with the continent of Asia.—M. B.
[g] Kæmpfer, Hist. du Japon, I. p. 11.
[h] "Their face, in shape, is nearer the rhomb than the oval."—M. B.
[i] Kæmpfer, Hist. du Japon, I. p. 29. Loubère, I. p. 81.
[k] Loubère, II. p. 94.

Their mechanical talents lie dormant from their habitual indolence. In iron and steel manufactures they are far behind, but excel in jewellery, and in miniature painting. The common people are employed in fishing, and other labours, for subsistence. The higher classes divide their time between inactivity and the tricks of a petty commerce.

Their chief commercial connexions are with Japan, China, Indostan, and the Dutch. Their exports consist of grain, cotton, benzoin, sandal wood, djate wood, Cambodia nuts, antimony, tin, lead, iron, loadstone, impure gold,[a] silver, sapphires, emeralds, agates, rock crystal, and marbles.[b] To these is to be added *tombac*, which, according to some, is a native copper containing gold;[c] according to others, an artificial compound.[d] They have also shagreen skins, nicely dressed and ornamented with figures, which form a valuable article of export, sometimes sold at enormous prices.[e]

Sommona-Codom, the god of the Siamese, is the same as Buddha. His priests and monks, whom we call talapoins, are called *jankoo* in the language of the country. His precepts, contained in a book called *Vinac*, are neither many nor rigorous: but the civil laws are severe and sanguinary. Slavery here is perpetuated by birth, except in the case of prisoners of war, and persons enslaved in consequence of debt, whose children are considered free. Enslaved debtors are also themselves free as soon as they have fulfilled their engagements.

The government of Siam is despotic and hereditary. The sovereign, as among the Birmans, receives almost divine honours. Three times in the day he presents himself for an instant before his great officers, who prostrate themselves on the ground.[f] There is no hereditary nobility to share the awful dignity of the crown. The monarch, when he pleases, may marry his own sisters, and even his daughters. But the power of this monarch seems to have suffered diminution in proportion to the increase of his courtly pomp. His revenue was said to have fallen, a century ago, from a proportion of forty to four or five. According to a census taken at that period, the adults of both sixes amounted to 1,900,000, which would give a population of between three and four millions. Loubère says, that in his time there was no army except some royal guards; and Mandelslo reckons the number which could be raised on emergency to be about 60,000, with 3000 or 4000 elephants. These estimates indicate a scanty population. The navy is composed of a certain number of galleys of different sizes, the chief merit of which consists in their rich decorations. The rivers of Chin-India have, in civil wars, been frequently the theatre of naval battles.

The history of the Siamese has its chasms, but is not loaded with any fabulous chronology. Their era goes back to the pretended disappearance of their god Sommona-Codom, 544 years before Christ. Their first king began his reign in the 1300th year of their era, or about A. D. 756. Wars with Pegu, and usurpations of the throne, constitute the sad and uniform epochs of the Siamese history subsequently to the discovery of the country by the Portuguese. In 1568 the king of Pegu made war on them, which was said by historians to have been on account of two white elephants which the Siamese refused to deliver to him; but probably the chief motive was to reconquer the coasts of the Bay of Bengal, which had been dismembered from his dominions by the Siamese. For want of attention, the politics of the Asiatics are sometimes supposed to be more absurd than they really are. After scenes of carnage on both sides, Siam became tributary to Pegu. But about 1620 Rajah Hapi delivered his country from that state of servitude. In 1680, Constantine Phalcon, a native of Cephalonia in Greece, having become a favourite with the king of Siam, opened a trade with France, with a view of supporting his ambitious designs; but, during the king's last illness, the grandees of the court ordered him to be beheaded, and the connexion with France was consequently broken off. The Birmans have not been able to reduce the Siamese to a state of permanent subjection.

To the south-east of the kingdom of Siam lies the PENINSULA OF MALACCA or Malaya, 550 miles long, and from 80 to 110 broad.[g]

The interior of this peninsula seems to be entirely occupied with vast natural forests. No maps, ancient or modern, describe it as containing towns or villages. In the year 1644, Governor Van Vliet, to whom we are indebted for a good account of Siam, attempted to send detachments into the interior. The level parts were covered with underwood, where it was necessary to open a road with the axe; and with marshes, in which the natives alone were able to get along over the trunks of felled trees.[h] When an eminence is gained, the eye is delighted with beautiful trees; but among these trees, brambles, thorns, and creeping plants, are so closely interwoven as often to present an insurmountable obstacle to the progress of the traveller. In these forests mosquitoes fly in swarms like thick clouds. At every step there is a risk of treading on a poisonous serpent. Leopards, tigers, and rhinoceroses, when disturbed in their native haunts, are ready to devour any traveller who is not provided with a strong escort, and who does not keep up a fire during the whole night. Nor is an escort easily commanded. The Malays, a hundred times more dangerous than the tigers and the serpents, never attend a European but with great reluctance. Even those who were subject to Dutch authority often seized the first opportunity to betray the persons whom they had been employed to conduct. In 1745, Van der Putten, a zealous traveller, undertook, with a detachment furnished him by Governor Albinus, to penetrate to Mount *Ophir*, called in Malay, Goonong-Lelang, situated near the sources of the river Moar, in the south-east of Malacca; but as soon as he quitted his boat, his escort gradually took to flight, and he could not accomplish his undertaking.

[a] "L'or de mauvais aloi."
[b] Van Vliet, Account of the Kingdom of Siam, p. 62. (in Dutch.)
[c] "Un cuivre aurifère," auriferous copper.
[d] Dalrymple, Oriental Repertory, I. p. 118.
[e] "Some are valued at a *cati* of gold, about a marc of gold and a quarter," ten ounces.—P.
[f] Van Vliet, p. 19.
[g] "200 by 30 to 40 Fr. leagues."
[h] Balthasar Bort, MS. p. 103, quoted in the Memoirs of Batavia.

The parts best known produce pepper and other spices, and some species of gums. The forests, arrayed in eternal verdure, contain aloes-wood, eagle-wood, sandal-wood, and *cassia odorata*,[a] a species of cinnamon. The air is impregnated with the odour of innumerable flowers, which perpetually succeed one another without an interval. But the uncultivated state of the country generates in many parts a highly noxious atmosphere, and occasions a general deficiency of human food. Fish, however, esculent herbs, and fruits, are not deficient in this country.[b] The animal kingdom is little known. Among the birds which seem to be numerous and extremely beautiful, the bird of Juno[c] is mentioned, which, without the tail of the peacock, displays a plumage equal to his in elegance and in beauty.[d e] The tiger, pursuing the antelopes over the rivers, sometimes falls a prey to the caiman.[f] From the hedgehog of Malacca is obtained the Malacca bezoar[g]—from the wild elephants plenty of ivory. Tin is the only mineral substance exported, though gold is found in some of the rivers. The tin mines of Pera are found in valleys. After large roots of trees, sometimes seven feet in depth, are removed, the ore is found in a fine black sand, which closely resembles it in appearance. When a rocky stratum[h] appears, the digging is discontinued, although it also seems to contain the same ore, because the mining resources of the Malays are too confined to enable them to make their way through the rocks.[i] Sometimes the Chinese undertake the mining operations, and they are decidedly more expert than the natives in refining and smelting the metal.

The maritime parts are divided into six Malay kingdoms; Patani, Tronganon, and Pahang, on the east coast; Johor at the southern extremity; Pera and Queda on the west coast. To these we may add Malacca and its territory, properly called Malaya. In the interior, the state of Manang-Cabo is separated from the Dutch territory by the Romboon mountains.[k]

In the time of Mandelslo, the city of Patani, inhabited by Malays and Siamese, was built of wood and cane, but the mosque was of brick, and the trade was in the hands of the Chinese and Portuguese, the natives being chiefly occupied in fishing and husbandry. According to this traveller, continual rains fall, accompanied with a north-east wind, during the months of November, December, and January. Oxen and buffaloes were used for agricultural purposes, and crops of rice were cultivated. Fruit and game were abundant; the forests swarmed with monkies, tigers, boars, and elephants.

A modern traveller praises Tronganon as a favourable mart for the purchase of pepper and of tin[l]. Pahang, (in Chinese, Pang-hang,) exports gold, areca nuts, and rattans.[m] The kingdom of Johor occupied the eastern extremity of this Chersonese. Batusaber, the capital of the kingdom, was situated sixteen miles[n] from the sea, on the river Yohor, in a marshy soil. But at present this kingdom is in a state of vassalage to a piratical chief, who is called king of Riom, and resides in Pulo-Binlang Island, one of those which divide the strait of Sincapoor[o] from that of Malacca. This strait derives its name from a Malay town, founded by the first colonies of that people after their emigration from Sumatra. Cape Romania, the southern point of Asia, is called in the country itself Oodjong Tanah.

The city of Malacca, founded by a Malay prince about the middle of the thirteenth century, was in the hands of the Portugese from 1511 till 1641, when the Dutch took it. According to Le Gentil, this place, which once rivalled Goa and Ormuz, has now very little commercial importance, and is weakly fortified. But the marshes which render the approach difficult, the river Crysorant, which partly encircles it, and the solidity of the works of the citadel of St. Paul, which are built of a ferruginous sand stone, render it capable of a long defence.[p] From 20,000 inhabitants, which it contained under the Portuguese, its population is reduced to 3000 or 4000. The suburb Tranquera is peopled with Chinese and persons of Portuguese extraction. Within the last half century some successful attempts have been made to cultivate the camphor tree in this neighbourhood, the produce of which has somewhat re-animated a languishing commerce.

Pera, a kingdom rich in tin, is governed by Mahometan princes, who are withheld from working their mines by a superstitious fear of giving offence to the genii of the mountains. The adjoining state takes its name from the capital Queda, a town containing 8000 souls. It has a harbour which is well frequented, and carries on a great trade in tin and elephant's teeth.

An English captain, having married the daughter of the king, obtained the sovereignty of the island of Pulo-Penang, on the coast of Queda, which he, without delay, transferred to his country. The English call it Prince of Wales' Island, and have formed on it an important establishment, as the harbour is so situated as to command the strait of Malacca, while the soil is rich, covered with teak forests, sugar canes, and rice fields, and found well adapted to the cultivation of pepper and indigo.[q]

In our general view of the races of mankind, we have

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[a] This is not the scientific name—probably the Laurus Cassia is intended.—P.
[b] Blancard, Commerce des Indes, p. 328.
[c] Phasianus argus?—P.
[d] Van Wurmb, Mem. of Batavia, II. p. 461. (in Dutch.)
[e] "Orné d'aussi belles taches," adorned with spots as beautiful.
[f] Valentyn, Malacca, p. 310.
[g] "Pierre de porc," swine-stone.—P.
[h] "Called Ibu Timbo, or the mother of tin."—M. B.
[i] Memoirs of Batavia, IV. p. 558.
[k] Is not this an error? "Rumbo, an inland kingdom, about 60 miles eastward of Malacca, may be regarded as the most ancient of the Malay states in the peninsula, still possessing the original written commissions from the parent government of Menangkabau, in Sumatra, and retaining a peculiar dialect."—*Ed. Encyc.*—P.
[l] Blancard, p. 328.
[m] Mem. of Batavia, IV. p. 344.
[n] "Six Fr. leagues."
[o] "Singapoura," Sincapore.
[p] See plate No. 37 in Valentyn, and the Memoirs of Batavia, IV. p. 325.
[q] Sir Home Popham's Description of Prince of Wales' Island, 1805. Howison, Extract in the Ephemerides of Weimar, XVIII. p. 129.

distinguished the Malays as the model of the fifth variety of our species. That people is not indigenous in the peninsula of Malacca, but one of their tribes invaded and colonized it in the twelfth century, having fled from the territory on the river Malaya,[a] in the island of Sumatra, before the victorious armies of a king of Java. This tradition has now been completely confirmed by the investigations of Messrs. Leyden and Marsden, according to whom, the Malays form the indigenous population of Sumatra, and probably also of Java. They belong, therefore, to the fifth great division of the world, Oceanica, which is to be described in the six following books.

[a] "Malayou."

Table of the Principal Geographical Positions of Chin-India

Places.	N. Lat.	E. Long.	Authorities.
	deg. min. sec.	deg. min. sec.	
Cape Negrais[b] . . .	. . .	. . .	Dalrymple.
Mergui	12 12	98 18 15	Forest.
Prince of Wales' Island	5 30	99 55 15	Popham.
Malacca	2 12	102 5 15	Batavian Memoirs.
Cape Romania . . .	1 30	104 5 15	Connaiss. des Tems
Tronganon	5 25	. . .	Blancard.
Capital of Siam . . .	14 20 40	100 50 15	Idem.
Pulo-Condor	8 40	106 31 52	Connaiss. des Tems.
Saigong	10 38	106 44 15	Blancard.
Faifo,[c] or Bay of Turon	15 57	108 15 15	Idem.
Huéfo or Kehoé . .	16 29	107 20 15	Idem.

[b] Lat. 18° 27′ N. Long. 94° 14′ E.
[c] Taifoo.

BOOK LIII.

OCEANICA.

PART I.

A General Description of this new Great Division of the World, comprehending the regions situated in the Ocean between Africa, Asia, and America.

We now leave the old Asiatic continent, the nations, cities, and empires of which have fallen under our view. Our attention is claimed by another world, or rather, perhaps, the magnificent fragments of a former world, scattered over the mighty ocean. There extends over a space of more than 8000 miles,[a] a labyrinth of islands, an immense archipelago, in the midst of which are twenty countries spacious like minor continents,[b] and one of them equalling Europe in extent.

These regions present in every quarter scenes fitted to move the most frigid imagination. Many nations are here found in their earliest infancy. The amplest openings have been afforded for commercial activity. Numberless valuable productions have been already laid under contribution to our insatiable luxury. Here many natural treasures still remain concealed from scientific observation. How numerous are the gulfs, the ports, the straits, the lofty mountains, and the smiling plains! What magnificence, what solitude, what originality, and what variety! Here the zoophyte, the motionless inhabitant of the Pacific Ocean,[c] creates, by its accumulated exuviæ, a rampart of calcareous rock round the bank of sand on which it has grown. Grains of seed are brought to this spot by the birds, or wafted by the winds. The nascent verdure makes daily acquisitions of strength, till the young palm waves its verdant foliage over the surface of the waters. Each shallow is converted into an island; and each island improved into a garden. There we behold a dark volcano rising over a fertile country, generated by its own lava. A rapid and charming vegetation is displayed by the side of heaps of ashes and scoriæ. Where the land is more extended, scenes more vast present themselves: sometimes the ambiguous basalt rises majestically in prismatic columns, or lines, to a distance too great for the eye to reach, the solitary shore with its picturesque ruins. Sometimes enormous granitic peaks boldly shoot up among the clouds; while, hung on their sides, the dark pine forest varies the immense void of the desert with its gloomy shade. In another place a low coast, covered with mangroves, sloping insensibly beneath the surface of the sea, stretches afar into dangerous shallows, where the noisy waves break into spray. To these sublime horrors a scene of enchantment suddenly succeeds. A new Cythera emerges from the bosom of the enchanted wave. An amphitheatre of verdure rises to our view. Tufted groves mingle their foliage with the brilliant enamel of the meadows. An eternal spring, combining with an eternal autumn, displays the opening blossom along with the ripened fruits. A perfume of exquisite sweetness embalms the atmosphere, which is continually refreshed by the wholesome breezes from the sea. A thousand rivulets trickle down the hills, and mingle their plaintive murmurs with the joyful melody of the birds animating the thickets. Under the shade of the cocoa, the smiling but modest hamlets present themselves, roofed with banana leaves, and decorated with garlands of jessamine. Here might mankind, if they could only throw off their vices, lead lives exempt from trouble and from want. Their bread grows on the trees which shade their lawns, the scenes of their festive amusement. Their light barks glide peacefully over the lagoons, protected by coral reefs, and, like a vast port, surrounding the whole island; the stormy winds never agitate the azure surface of this imprisoned sea.

This region was long explored in quest of a *Terra Australis*, a continent which was supposed to rival the old world in extent. After a series of multiplied voyages had dissipated that illusory expectation, geographers still recognized in this wide region a fifth great division of the world. Unless we fix New Holland and New Zealand as appendages of Asia, we must create a new division to comprehend these vast countries. If this necessity is once admitted, the principle employed ought to be purely scientific. What reason can there be for dividing into two this great archipelago, which presents on the terrestrial globe such a manifest and striking whole? Why seek for a line of demarcation between the Moluccas and the Papuas, where none is traced by nature? The ancients restricted the name of Asia to the continent so denominated. When the modern discoverers of Sumatra, Java, and Borneo, connected these islands with Asia, they were ignorant of the extent of that archipelago of which they formed a part. But we have no reason for declining to restrict the name of Asia to the limits assigned to it by nature.[d]

The Chinese Sea separates Asia from the islands of

[a] "3000 Fr. leagues."
[b] "Une vingtaine des grandes terres."
[c] "D'une mer pacifique," of a peaceful ocean.
It has been observed already, in a note to the general description of Asia, that the islands connected with Asia by geographers, have this in common, that their inhabitants have partaken more or less of the civilization of E. and S. Asia, whereas those of the islands E. and S. of them, have remained in their original barbarism.—P.

the great ocean, as the Mediterranean separates Africa from Europe. To the west we continue the boundary line through the strait of Malacca, and then turning round the north point of Sumatra, we proceed to the point where the 92d meridian east from London[a] crosses the equator. Through the whole southern hemisphere that meridian will form a convenient division between the seas of New Holland and those of Madagascar and Africa. The islands of Amsterdam and St. Paul will, on this principle, remain connected with the archipelago of the Indian Ocean. When we proceed from the Chinese Sea northwardly, the channel between Formosa and the Philippines being the broadest, marks the natural boundary. From this we draw a line which, following that part of the ocean which is most free of islands, circumscribes the Japanese seas at a distance of 300 or 450 miles,[b] and reaches the point of intersection of the 40th parallel of north latitude with the 152d meridian.[c] The 40th parallel will continue to bound the new division of the world, till we come to the point where it is crossed by the 158th western meridian from London.[d] Taking our departure from this point, we separate the North American seas from those of the Oceanic archipelago by the shortest line that can be drawn from this to the point of intersection of the 108th western meridian[e] and the equator. This meridean will be our boundary through the southern hemisphere.[f]

The fifth part of the world thus determined is found to be situated in the Great Ocean, that which, of all others, is THE OCEAN, by way of eminence. This essential character is not common to it with any other division of the globe: it is a character which impresses a special physiognomy on its geography, as well as on its natural and its civil history. It is therefore worthy of being made the foundation of its name. It will be called OCEANICA, and its inhabitants the Oceanians; names which will supersede the unmeaning or inaccurate designations of Australasia, Notasia, Austral India, and Australia. New Holland has not one Asiatic feature. Extending the principle of the nomenclature which is in present use, we ought to call Africa "Occidental Asia." This designation would be equally correct with that of Austral Asia. There is no occasion for perpetuating the memory of the pretended *Terra Australis* in the name of a part of the world which is not exclusively situated on the Austral (or southern) hemisphere. The happier term of Polynesia will be preserved for that subdivision of Oceanica to which it has been specially applied.

In order to study the details of this vast territory, we proceed to divide it into several subordinate groups; and in our classification we shall endeavour to reconcile the rigorous principles of natural geography with the routine of other geographers. We shall, therefore, first go over the islands situated between the Indian Ocean, the Chinese Sea, and the Great Ocean, as far as the 132d eastern meridian.[g]

These islands, which will form our north-west Oceanica, generally pass for an appendage of Asia, although the Chinese Sea determines so evidently the actual frontier of Asia. Not to browbeat with much disdain a prejudice consecrated by the usage of two centuries, we shall, in the arrangement of our materials at least, make these regions intermediate, while we lead the unprejudiced reader to recognize the natural classification. From the Moluccas, we shall pass by a short interval to Great Oceanica, to which accident has assigned the name of New Holland. Arranged round this immense isle we find New Guinea, New Britain, New Ireland, Solomon's Islands, Louisiade, Terra del Espiritu Santo, New Caledonia, New Zealand, and Van Diemen's Land. This central portion of Oceanica, (which it will perhaps be necessary to subdivide again into two regions,) includes the countries least known, and the most numerous remains of the Oceanian negro race, who appear to be the true aborigines of this part of the world. Our third section will include the eastern part of Oceanica, or the numberless small islands which cover the Pacific Ocean from the Marians to Easter Island and Owhyhee. To these the learned President De Brosses has applied the name of Polynesia,[h] which the Portuguese authors, Joam de Barros[i] and Diego Couto,[k] had, two centuries before, given to the Moluccas, the Philippines, and others to the east of Java.

Nature has given this part of the world a very prominent and characteristic physiognomy. No portion of the surface of the globe has more numerous inequalities, and in none, except America, have the chains of mountains so striking a polarity—so marked a direction from north to south. At the same time, these chains generally present about the middle a great bend from west to east. The best marked among them is that formed by the Marian, the Caroline, and the Mulgrave islands, which are probably connected by means of St. Augustine's Island, and some other isolated links, with the archipelago of the Navigators' islands, or with that of the Friendly islands. Their general direction is from north-west to south-east. Even among the Carolines, where that Polynesian chain turns due east, the particular links lie north and south. Another great chain makes its appearance in the Isle of Luzon, the largest of the Philippines, which passes by the island of Palawan into that of Borneo. The direction of this well known branch is from north-east to south-west. It bounds on one side the bason of the Chinese Sea. More to the east this chain is converted into a number of minor ones, united in groups varying in their structure. The chains of Celebes and Gilolo are well marked; but a larger and higher one crosses New Guinea, where some of its elevations are covered with perpetual snow. In New South Wales, the long line of the Blue Mountains extends to Van Diemen's Land, terminating in South Cape and Cape Pillar, immense masses of basalt, which give a magnificent idea of this Cordillera of central Oceanica. The fourth great chain takes its commencement at the Andaman and Nicobar islands; then gives rise to the islands of Sumatra, Java, Timor, and others. It runs in the form of a bow from north-west to south-east, then

[a] "90° E. from Paris"
[b] "100 to 150 Fr. leagues."
[c] "150th E. from Paris."
[d] "160th W. from Paris."
[e] "110th W. from Paris."
[f] "Hémisphère central."
[g] "130th E. from Paris."
[h] De Brosses, Hist. de Navig. aux Terres-Australes, I. p. 80.
[i] Barros, Asia, dec. I. tome I. p. 147.
[k] D. Couto, Asia Contin. t. III. p. 139.

due east, but it probably passes into New Holland, by Cape Diemen, (the Cape Leoben of the French maps,) where it can scarcely have any other direction than north and south.

All the archipelagos of eastern Oceanica lie north and south. New Zealand, New Caledonia, and the New Hebrides, form well marked chains. That of Solomon's Islands, bending from the south-east to the north-west, is continued in New Ireland and New Hanover. It often happens that the small chains are individually terminated by a larger island than the others of which they are composed. Thus the islands of Otaheite, Owhyhee, and Terra del Espiritu Santo, are found at the extremity of a line of smaller islands. These analogies might have facilitated the progress of discovery, and especially contributed to complete the survey of each archipelago. By carefully observing the direction of a chain, navigators might have been almost certain of discovering new islands; and even still, they ought to attend to a principle which may put them on their guard against the immense reefs which, in all probability, follow the direction of chains at the bottom of the ocean.

Among these thousands of islands, some shoot up to a considerable elevation, generally presenting a conical form. Many of them, according to Forster, are basaltic: the centres of these mountains often contain wide tunnels, and at other times round lakes which may be taken for ancient craters. Although the presence of volcanic substances has not every where been ascertained by satisfactory evidence, we know already in Oceanica a greater number of volcanoes than in any other part of the world. Sailors sometimes speak of them with admiration, at other times with terror. In one place, as in Schouten's Islands, near New Guinea, the flames and the smoke rise calmly over a fruitful and smiling country; in another, as in the northern part of the Marian islands, dreadful torrents of black lava darken the shore. The volcano of *Gilolo* broke out in 1673 with a violence which made the whole of the Moluccas tremble. The ashes were carried as far as Magindanao, and the scoriæ and pumice stones floating on the sea, seemed to retard the progress of the vessels.

All the low islands seem to have for their base a reef of coral rocks, generally disposed in a circular form. The middle space is often occupied by a lagoon; the sand is mixed with pieces of broken coral and other marine substances; proving that such islands have been originally formed by these coral rocks, which are inhabited, and according to some, created by *polypi*, and afterwards augmented and elevated by the slow accumulation of light bodies drifted to them by the sea. It is, however, very remarkable, that among the islands so constituted, some are almost level with the sea, while others have hundreds of feet of elevation, of which last Tongataboo is an example. On their summits are found coral rocks perforated in the same manner with those found at the water's edge. Now the madrepores, millepores, and tubipores, which raise these submarine habitations, (for the true coral polypus is never found there,) grow over the hardened spoils of their dead predecessors. They cannot live above the sea, a circumstance which shows that the sea, at a former period, washed these rocks, and gradually retired and left them exposed.

Have the zoophytes or polypi themselves formed the stony bodies which they inhabit? or do they find them ready prepared by the hand of nature? This is one of the most interesting problems in physical geography; but hitherto, the observations made are too vague and too recent to afford a complete solution of it. Messrs. Anderson and I. R. Forster[a] incline to think that these animals form the matter which composes the coral rock, and consequently, that new islands may be formed by their labours. On this point Captain Cook is decided. Dalrymple thinks that the coral rocks are formed at the bottom of the ocean, from which they are often detached by currents and tempests, and thrown on the sand banks.[b] This may, in some localities, take place, but it cannot apply to the reefs which rise like walls in the middle of the deepest sea, such as the formidable rocks on which Captain Flinders nearly perished, and which probably proved fatal to La Perouse.[c] The great reef of New Caledonia is so steep, that Captain Kent, commander of the Buffalo,[d] sounding at no greater distance than twice the length of his ship with a line of 150 fathoms, could find no bottom. The reefs round New South Wales also rise like perpendicular walls from a very deep bottom. Such structures must owe their origin to the animals themselves, unless we should advance a new doctrine, that they grow by a vegetation resembling that of the fuci, and that the polypi found on them are analogous to the insects which take up their abode on herbs and trees, a theory to which the aborescent appearance of some corals, and the fungous forms of others, give some countenance.

The reefs render the navigation of this ocean exceedingly dangerous. In some parts of it these rocks reach the surface, while in others they lie dangerously concealed, having over them only a few feet of water. Wo to the mariner who, in consequence of unacquaintance with the seas, or the power of the currents, gets entangled amidst the pointed spires of this submarine city. The intelligent Captain Cook was neither able to foresee nor avoid such dangers.[e] It happened at one time, by a singularly fortunate accident, that the point of a rock which had pierced his vessel was broke off, and by sticking in the place, and acting as a plug, saved the vessel from destruction.

The reefs often extend from one island to another. The inhabitants of Disappointment Island and those of Duff's Group can make their visits by passing over a long line of reefs from island to island, presenting the appearance of a regiment marching along the surface of the ocean. On those reefs, which are covered with water, are found immense collections of *mollusca* and shells. Muscles of every variety, pearl oysters, *pinnæ marinæ*, star-fish, and *medusæ*, collect in millions.[f]

A part of the world so constructed must contain an infinite number of straits. A few of the most conspicuous are all that we can notice. The strait of Sunda

[a] I. R. Forster's Observations, p. 149. G. Forster's Voyage, II. p. 145.
[b] Dalrymple's Historical Collection, I. p. 22.
[c] Flinders, Annales des Voyages.
[d] Cited by Barrow in his Voyage to Cochin-China.
[e] Forster's Opuscula, I. p. 52, and 253. (in German.)
[f] Martyn's Figures of Shells collected in the South Sea, 1784.

is the principal entrance of the Chinese sea. Asia is separated from Oceanica in general, and from Sumatra in particular, by the long strait of Malacca. To the north, the wide channel between the island of Formosa and the Philippines has hitherto received no name. To the east of Java, we distinguish, among a multitude of others, the strait of Bali, affording to the ships bound for China a passage which has some advantages over that of Sunda. The strait of Macassar separates Borneo from Celebes. To the east of this last island the great Molucca passage opens. The history of navigation has given a celebrity to the straits adjoining New Guinea. That of Waigiou[a] separates, with some geographers, Asia from Australia. Those of Dampier and Bougainville open useful tracks for navigators. A more important strait separates New Guinea from New Holland; it bears the name of Torres, who first discovered it, although his discovery was long neglected and forgotten; the southernmost channel, discovered by Captain Cook, is called Endeavour Straits. At the southern extremity of New Holland, and on the north of Van Diemen's Land, Bass's strait opens one of the most important communications between the great Pacific and the Indian ocean. Cook's strait separates from one another the two islands of New Zealand.

Many parts of the great ocean receive particular designations from the countries whose shores they water. Thus we distinguish the Chinese Sea, a real Mediterranean, the Sea of Celebes, and the Gulf of Carpentaria. Old charts give the waters which separate the islands of Java and of Timor from New Holland the name of the Landichol Sea, probably composed of two Malay terms, *laoot*, a sea, and *kidor*, south. Captain Flinders has proposed to give the waters lying between New Caledonia, Solomon's Islands, New Guinea, and New Holland, the name of "the Coral Sea."

The winds and currents which prevail in this vast ocean may all be reduced to a single principle, the general motion of the atmosphere and the sea in a direction from east to west, opposite to that of the rotation of the earth.[b] This occasioned the mistakes of Quiros, Mendana, and other navigators, respecting the length of the courses which they had sailed.[c] This general motion usually acquires an increased force in the different straits, which are almost all directed from east to west. In the neighbourhood of the Philippines and of New Caledonia, the rapidity of the westerly current is extreme. But the more extensive islands, heated by the sun, often attract to their central parts the atmosphere of the surrounding sea, and thus occasion winds opposite to the trade winds. Such are the west winds which prevail on the west coast of New Holland. These monsoons are not all known. Each island has its sea and land breezes, the former prevailing by day and the latter by night. At a distance of forty degrees north and south of the equator, is the region of storms and variable winds; the west winds, however, seem to prevail in the northern hemisphere, while Cook always found the winds easterly in the seas surrounding the south pole.

The great countries of Oceanica are exposed to the influence of a vertical sun. It is probable that New Holland, unless it contains inland seas, has a climate as hot and arid as Africa. The marshy shores of some islands in the north-west of Oceanica, exposed to an intense heat, generate a pestiferous air, which may be corrected by a more extensive cultivation. Notwithstanding these local inconveniences, Oceanica presents to the industrious, the healthy, and the temperate, a greater diversity of delightful climates than any other part of the world. Such islands as are small and elevated resemble so many paradises. By selecting localities with the proper elevations, the Englishman may find his fresh lawns and his moss-covered trees, the Italian his orange-groves, and the West-Indian planter his fields of sugar-cane. The small extent of these islands procures for them the temperature of the ocean. The heat never becomes insupportable even for northern Europeans. The air is continually renewed by the light sea and land breezes, dividing the empire of day and night. There perpetual spring is rarely disturbed by hurricanes or earthquakes.

We have already, in another part of this work, taken notice of the imperfect features of resemblance presented by the animal kingdom in the different countries of Oceanica.[e] The didelph-opossums,[f] the phalangers, the kangaroo-philanders, the cassowaries, and a few other species, seem common to several countries in this part of the world. The case will probably be found to be the same with some other species, when the natural history of these countries has been attentively observed. If several of them possess animals peculiar to themselves, that circumstance will appear no way surprising in a world of islands. None of the great races of quadrupeds, either of Asia or New Holland, has extended to the small islands of Polynesia. The hog is the only one found every where domesticated, and is of the same species as in India and China. This, together with dogs, cats, and rats, formed the whole quadruped class in these islands before Captain Cook supplied them with goats and cattle.

Ornithology offers, through the whole of Oceanica, a little more variety, along with many features of mutual resemblance. Common poultry abounds, and is of a larger size than ours. Labillardiére saw on the Friendly Islands several kinds of loris and other birds, commor to the Philippines and the Moluccas. In Otaheite as in Amboyna, small birds swarm in the groves of bread-fruit trees. Their song is agreeable, though it is generally said in Europe that the birds of warm climates are destitute of the powers of melody. Remarkably small parroquets, of a beautiful sapphire blue, live on the foliage of the highest cocoas, while others of a greenish colour, diversified with red spots, appear usually among the bananas, and often in the houses of the people, who tame them, and set a high value on their red feathers. These species are generally diffused between the 10th northern and the 20th southern parallel of latitude. The birds of paradise no where sport their light bodies and airy plumage but in the balmy winds of the shores of New

[a] Waijoo, Waygoo.

[b] For the theory, see p. 121 and 136, of this volume.

[c] "Who believed they had made far less distance than they really had"—M. B.

[e] See p. 188, of this volume.

[f] The term didelphis (Linn.) includes all the marsupial or pouched animals. The opossums are natives of America.—P.

Guinea. The aquatic birds are every where the same. In Amboyna, as well as in Otaheite, we find the dark green king-fisher, with a white neck surrounded with a ring of green. A large species of cuckoo, and several sorts of pigeons or turtle-doves nestle among the branches, while the blue herons gravely stalk along the sea shores in quest of shell-fish and worms. The tropic bird inhabits the caverns in the steep sides of the rocks, where the Otaheitans go in quest of it for the sake of the feathers of its tail. For the same purpose, they ensnare the frigate bird, a bird of passage. The *spheniscus* (manchot) of the Great Ocean differs essentially from the penguin of the Atlantic.[a] These birds, almost without wings, found at a distance of 1300 miles[b] from any known land, live chiefly in the frigid zone, and even in the icy seas. But one species, the *Aptenodytes papua*, is seen at New Guinea, and among the Papua Islands.[c]

No sea abounds so much in fish. From Easter Island to the Sandwich Islands, La Perouse was followed by immense shoals of fish; some individuals were easily identified by the harpoons sticking in their bodies. Between the shores of Borneo and those of New Guinea, we find an entire nation of fishermen called Badshoos,[d] who are constantly in their boats, and live on fish. In the neighbourhood of New Zealand, Labillardière saw shoals of fishes, which produced by their motions a waving movement on the surface of the water, like the advance and recess of a tide.[e] The species are in general the same that are found in the Indian Ocean. The bonitos, the dorados, the tunnies, the surmullets, the rays, the mullets, seem to abound alike on every shore. There are a hundred new species, most of which are vaguely determined, as well as two new *genera*, the *Harpurus* and *Balistopodes*.

The seals of the Great Ocean, those at least which Peron observed on the shores of New Holland, differ from those of the Atlantic. Perhaps the case is the same with the whales, which sometimes get entangled among the reefs, where their immense bodies have not room to turn. All the lagoons between the reefs and the shores abound with lobsters, common oysters, pearl oysters, and shells of extraordinary size and beauty. The crabs in some places acquire an enormous size; they eat cocoa-nuts. The lobster of the Moluccas seems to be common to the whole ocean.

The number of poisonous fish seems to be considerable. Quiros narrowly escaped death by eating a *sparus* caught on the coasts of Terra del Espiritu Santo.[f] The companions of Cook came near being poisoned at the same place by the same food. It is thought that this fish only becomes dangerous when it has fed on particular species of *medusæ*. But the *tetrodon*,[g] which poisoned Forster on the coast of New South Wales, always contains a narcotic poison. At Otaheite there is a sea eel of a very deleterious quality, and a small red lobster which is still more fatal to those who eat it.[h] Anson's crew found near the Marian Islands so many fish,[i] that they resolved to give up eating them entirely. This inconvenience seems therefore common to all the seas belonging to the Great Ocean.

The vegetable kingdom of Oceanica presents to us all the riches of India in new splendour, and accompanied by other treasures unknown to Asia. In the Sunda Islands, the Philippines, and the Moluccas, rice occupies the place of wheat; and the culture of it is probably extended to New Guinea.[k] Farther to the east, in the islands of Polynesia, there are four exceedingly useful esculent plants, which grow either spontaneously, or under the influence of culture; the sweet potato, the yam, and two species of *arum*, from which, by culture and boiling,[l] a sweet farinaceous substance is obtained.

Two orders of trees are spread over all the middling and small islands of Oceanica, which delight both the eye and the taste. The numerous family of the palms is extended over the most remote and the smallest islands. Between the tropics there is scarcely a rock or a sand-bank on which these trees do not display their astonishing vegetation. The palms[m] have, in the interior structure of their trunks, no analogy with other trees.[n] In habit and in structure they resemble the ferns, in their blossom the grasses, and the asparagi and dracenæ in their mode of fructification. But no trees are so portly and magnificent as the palms. They present a straight column, perfectly cylindrical, crowned at the summit with a vast load of perennial leaves, arranged in circles one over another, and put forth from their common receptacle large panicles, partially inclosed in ample sheaths, and loaded with flowers and with fruit. But their majestic appearance is their least merit. Their beauty is surpassed by their usefulness. The external layers of the trunk furnish a hard and heavy wood, which may be formed into planks and stakes. The sheaths which contain the clusters of fruit acquire such thickness and consistence that they are often used as vessels. The large leaves are employed for roofing wigwams and cottages. Materials for wadding, flock, and cordage,[o] are furnished by the fibrous pericarp of the cocoa-tree, by the leaves and leaf-stalks of several other species, and by the filamentous tissue which, in all of them, covers the trunk. Of these are made ropes, cables, and even

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[a] The term "spheniscus" is added by the translator. The term "manchot" is applied to the *penguins* of the southern seas, in opposition to the term "pingouin," which is applied to the penguins of the northern seas. The former (Aptenodytes, Linn.) are divided by Cuvier into three sub-genera, one of which is the Spheniscus, or Cape Penguin; the species found in the S. Sea being arranged under the other divisions. The *penguins* of the N. Seas are arranged by him under the genus Alca, (Linn.) In the Ed. Encyc. the genus Spheniscus includes all the southern penguins, (manchots,) except the Patagonian penguin, (Aptenodytes.)—P.

[b] "500 Fr. leagues."

[c] Forster, Historia Aptenodyt. Nov. Comm. Gott. 1780. Vol. III. p. 121. Sonnerat, Voyage à la Nouvelle-Guinée, p. 181.

[d] "Badschus," Badjoos.

[e] Labillardière, Voyage, II. p. 86.

[f] Dalrymple's Historical Collect. I. p. 140.

[g] Tetraodon, Linn.

[h] Missionary Voyage, Appendix, ch. 8—10.

[i] So in the original, (tant de poissons.) But should it not be so many poisonous fish?—P.

[k] "There are two species of it; that of the upland is whiter, larger, better flavoured, and keeps longer; that of the low land is more prolific, but does not keep so long, and its taste is insipid."—M. B.—P.

[l] "Cuisson," cooking in any form.

[m] Desfontaines, Memoires de l'Institut, 1796; Memoire sur l'organization des Monocotylédons ou plantes à une feuille séminale. (Memoir on the organization of the Monocotyledonous plants, or those with one seminal leaf.)

[n] "With trees properly so called," i. e. with dicotyledonous trees, or those with concentric layers of wood, such as all the trees of our forests. The palms have no concentric layers.—P.

[o] "De la bourre et de la filasse."

sail-cloth, and they are used as oakum in caulking vessels. The leaves of the Macaw tree (latanier) serve for fans to the Indian fair ones; those of the *Borassus flabelliformis*[a] furnish parasols which can cover ten people at a time. The leaves of some palms are used for writing on: the shell of the cocoa-nut supplies us with a natural cup. This order of trees furnishes a number of excellent dishes. The sweet and pulpy substance surrounding the seeds of some, as the *Areca catechu* and the *Phœnix dactylifera*; the perisperm of the seeds in others, as the cocoa-nut, *cycas circinalis*, &c.; and the terminal bud of the cabbage-palm (*Areca oleracea*,) are eaten and dressed in a variety of forms. The milky liquid contained in the large cavity of the cocoa-nut is capable of being converted into wine, vinegar, and alcohol. From the same fruit a good oil is procured.

Another family of nutricious trees enjoyed by the Oceanian nations is that of the *Artocarpi*, or bread-fruit trees. This valuable genus rises to a height of more than forty feet. Its trunk acquires the thickness of the human body. The fruit is as large as a child's head. Gathered before it is fully ripe, and baked among ashes, it becomes a wholesome bread, resembling fresh wheaten bread in taste. For a period of eight months, this tree yields its fruits in such profusion, that three of them will support a man for a year. The inner bark of the same tree is manufactured into a kind of cloth. Its wood is well adapted for building cottages and canoes. Its leaves are used as napkins; its glutinous and milky juice furnishes good cement and bird-lime.

It is rather a surprising circumstance, that the great Oceanic country of New Holland alone is destitute of these two vegetable tribes. The bread-fruit, which is spread as far as New Zealand, has evidently followed the civilization and the emigrations of the Malay race. Probably the palms will be found on the coasts of Carpentaria and De Witt's land, which have not been well explored; and perhaps their propagation in a southern direction has been arrested by a great inland sea, or a great mountain chain. The *Eucalypti*, the *Casuarinæ*, and some other large trees indigenous in the southern part of New Holland, have spread themselves chiefly over that portion of the remainder of Oceanica which lies in the southern hemisphere. The gum trees and *dracænæ*[b] of the north-west coast, connect again the Flora of this great island with that of Malacca and the adjoining parts of the continent. As yet our information respecting New Holland is too slender to enable us to descant on the relations which it bears to the rest of this division of the world.

The fruit trees of India abound in the Sunda islands, and the other islands in their vicinity. Perhaps they have been brought thither by colonies, or at least improved by culture. They have the sweet *mango*, the *Eugenia odorata*, the *sitodium*, and the *cynometra*, distinguished for their oily and farinaceous kernels, resembling those of the hazel-nut, and inclosed in pulpy fruits surrounding the trunk of the tree. They have the tamarind, which, with its acid juice, alleviates the febrile heats so incident to the inhabitants of that climate. The pomegranate and the orange abound in all their varieties. The orange tree extends as far as the New Hebrides. The bamboo, the sugar-cane, and the nardus, three gramineous species indigenous in India, grow still more luxuriantly in the marshes of Java and Sumatra than on the banks of the Ganges. The sugar-cane is found as far to the east as Otaheite, but it differs essentially from that of the West India islands.

In the islands of the north-west of Oceanica some valuable products are more perfect in quality than in any other locality; such as sandal-wood, aloes-wood, or calambac; the *Melaleuca leucodendron*, which produces the oil of cajeput; the *Amyris elemifera*,[c] which gives out the resin called elemi from incisions in its bark; the *aunota*, *cassia*, ebony, and several others yielding valuable gums, the uses and even the names of which are unknown in Europe. These are probably found in all the Oceanian countries. In Otaheite there has been found sandal-wood of good quality.

Under such a sky as that of the islands of the Great Ocean, we may expect to meet with a multitude of those plants which are distinguished by the brilliancy of their colours, and the grace or singularity of their forms, but scarcely known to us beyond the precincts of the stove and the greenhouse. It is only among a small number of readers that the names of the *hibiscus*, the *erythrina*, *aralia*, *ixora*, *bauhinia*, and *euphorbia*, recal the ideas of vegetable beauty and magnificence. Every one, however, knows those which contribute, by their aromatic pungency, or grateful odour, to the luxuries of the table. All the islands of the north-west of Oceanica abound in the two species of pepper called the long and the round; the produce of the one being presented to us in the form of long spikelets containing seeds of minute size, while we know the other only in the state of round grains separated from the spike. Of these plants immense plantations are seen; but they are not found in a state of nature;[d] at least this is the case with the black pepper, a native of Malabar.[e] The islands of eastern Oceanica produce in too large quantity the intoxicating pepper called *Piper methysticum*, used for preparing the dangerous drink called *ava* or *kava*. The cinnamon tree grows abundantly in Sumatra and the adjoining islands. In the Moluccas nature had multiplied in the amplest profusion the *Eugenia caryophyllata*,[f] the *calices* of whose numerous flowers are so well known in the European market under the name of cloves; and the *myristica*, the fruit of which forms our nutmeg, and the inner bark of it our mace. The jealous avarice of the Dutch East India Company confined these species entirely to the small islands of Banda and Amboyna. The policy of other nations has gone in quest of these lucrative trees to New Guinea, and though their researches have not yet proved successful, it is confidently believed that they exist in that country. The nutmeg tree grows also in Borneo.

But, if the most agreeable aromatics enrich this part of the world, the most terrible poisons are found in their

[a] "Palmier eventail," fan palm.

[b] "Les gommiers et les dragonniers."

[c] "Le canari." The A. elemifera is given as a native of America. Other species (A. protium and dentata) are given as natives of the E. Indies. It is simply "canari" in the original.—P.

[d] "On les trouve aussi incultes." They are also found growing wild or uncultivated.—M. B.

[e] Crawford's History of the Indian Archipelago, vol. I. book IV. chap. V.

[f] "Caryophyllus aromaticus."—*Jussieu.*

company. The same heats of a vertical sun give energy to the juices of the fatal and of the salubrious species. The tree known under the name of the *Bohan upas,*[a] or the "poison tree," saddens the forests of Turat, of Celebes,[b] and of Balambooang in the island of Java.[c] It seems to belong to the genus *Euphorbia;* at least the poison is not a gum-resin exuding through the bark, but a milky juice which issues from the branches when broken over. This tree has been the subject of many exaggerated reports. Even the philosophical Rumphius tells us that no other plant can live within the distance of a stone-cast round it; that if the birds happen to light on its branches, they instantly drop down dead; and that, in order to procure the gum without endangering life, it is necessary to have the whole body covered with a strong cotton cloth. He adds, that a single drop of its recent juice applied to the skin produces either immediate death, or an ulcer of a most malignant character, and extremely difficult to heal.[d] The inquiries of Messrs. Deschamps and Leschenault de la Tour have thrown some light on this mysterious tree. The former broke its branches without experiencing any harm: the latter confirmed the fact, that the juice of the upas, when mixed with the blood, occasions speedy death; but at the same time he showed that the immediate application of ammonia had the power of arresting its fatal effects.[e]

Having given a general physical portrait of Oceanica, we shall take a view of the races of human beings by whom this part of the world is inhabited. They seem to be referable to two stocks, totally distinct both in physiognomy and in language; the Malays, or Yellow Oceanians, and the Oceanian Negroes.

The Malays are no longer considered by the learned as having originally come from the peninsula of Malacca: it is now understood that it was not till a comparatively recent period that they became inhabitants of that country. Their national historians trace their origin to the island of Sumatra; they also describe them as connected with the Javanese; but we find them at present extending over numerous countries. Not only are all the inhabitants of the maritime parts of Borneo, Celebes, Luzon, and the Moluccas of the Malay race; but the innumerable tribes of Polynesia, or eastern Oceanica, seem to have the same origin. Although the Marian Islands are 5500 miles[f] from Easter Island, and though Owhyhee is at nearly an equal distance from New Zealand, we have a collection of facts authenticated by the concurring testimony of numerous observers, which force us to regard the families disseminated over this wide region as having a common origin.

These islanders have tawny complexions, varying a little in the different tribes, independently of any ascertainable circumstances in their habits of life or their climate. The fairest are generally in the most westerly regions; some of them, as the Battas of Sumatra, are directly under the equator. The hair of the head is long, lank, rough, and always black. The hair of the beard, and in general of every part except the head, is scanty. They are in the practice of plucking out that of the beard in their youth. The Mahometan priests, affecting to wear long beards, cultivate them to the best of their power, but not with so much success as to escape ridicule. Their persons are short, squat, and robust; their lower limbs somewhat large, but not ill-formed. The busts of the females are much inferior in symmetry to those of the women of Indostan. The face is round, the mouth wide, the teeth remarkably good, the chin square, the cheek bones high, the cheeks rather hollow. The nose is short, and small, never prominent, but never flat; the eyes are small, and, like those of other orientals, always black. They are an ill-looking people compared to the Arabs, Birmans, and Siamese. They are less handsomely formed than the Chinese, but have much better features.[g] [h]

Differences in colour and in the appearance of the hair have been observed between the great and the common people in Otaheite,[i] which led Forster to believe that a Malay colony had subdued in these islands some prior negro tribes, of the race which inhabits New Guinea and New Holland. But others may, with some probability, ascribe this difference to habit and diet, as the great live on the flesh of quadrupeds, and the common people chiefly on fish.

The similarity of the languages, as exhibited in the very imperfect vocabularies given by Forster, Father Gobien, Marsden, and others, is strongly marked. The inhabitants of eastern Oceanica speak the same language in different dialects, and this presents a singular analogy to that of the Malays, particularly that spoken in Sumatra.[k] M. Du Petit Thouras says, that the resemblance extends even to the language of Madagascar, which is its richest and most regular form. Mr. Crawford denies the identity of the vocabularies of the different islanders, and says, that on the contrary, even those tribes which are the nearest neighbours generally speak languages totally different and unintelligible to one another; yet, he remarks, that in character and structure, they are all exactly similar. Their roots are different, but the mode of applying and combining them is universally the same.

They have all the same form of government. Captain Cook tells us that in Hamao, one of the Friendly Islands, Tamalao signifies a chief.[l] Father Cantova, speaking of the Carolines, tells us, that "the authority of government is divided among a number of noble families, the heads of which are called Tamoles; and that in every province there is a principal Tamole, to whom the others are subject."[m] The same species of feudal aristocracy prevails in the greater part of the islands of the Ocean. Cook tells us, that in the Friendly islands, the chiefs never come into the presence of the monarch without demonstrations of profound respect, such as touching his

[a] "Bohon oupas."
[b] Valentyn, Description d'Amboine; Vegetaux, p. 218.
[c] Deschamps, Annales des Voyages, I. 70.
[d] Rumphii Hortus Amboinensis, t. II. tab. 87.
[e] Memoir, in the "Annales du Muséum."
[f] "2000 Fr. leagues."
[g] Blumenbach, Dec. Cran. III. tab. 29. Crawford's Hist. of the Indian Archipelago, Vol. I. p. 22.
[h] The above differs from the character as given in the original. "Complexion tawny; hair black, soft, thick, abundant, and curling; head slightly narrowed above; forehead a little convex; the cheek-bones not at all prominent, but the upper jaw slightly projecting; the nose broad and flattened at the tip, but not like that of the Negro."—P.
[i] Bougainville, Voyage autour du Monde, p. 211.
[k] Marsden, Archæologia, vol. VI.
[l] Third Voyage.
[m] Lettres Édifiantes et Curieuses, t. XV. p. 312. (Edition of 1781.)

feet with their heads and with their hands.[a] Father Cantova's letters inform us that the Tamoles of the Caroline islands are approached with the same reverence. When any one of them gives an audience, he appears seated on an elevated table, the people bow to the earth before him, and, at whatever distance they come in sight, they walk with the body so much bent that the head is almost between the knees, till they are near his person; they then seat themselves on the bare earth, and receive his orders with downcast eyes and other demonstrations of the deepest reverence. His words are regarded as oracles, and his orders are blindly and implicitly obeyed. In imploring any favour, they kiss his hands and his feet.[b]

In the Friendly Islands it is customary to honour their chiefs and strangers with midnight dances, accompanied with vocal and instrumental music.[c] In the Caroline Islands, similar concerts are held in the evenings around the houses of the chiefs. In going to sleep, the latter are always serenaded by a band of young musicians.[d]

The dances in the Pelew Islands, the Carolines, and the Ladrones, and those in the island of Wateoo, to the S. W. of Otaheite, have a striking resemblance.[e] The ceremonies on several solemn occasions are the same in islands situated at the greatest distances. The inhabitants of the Pelew Islands, those of the New Philippines, and of the Carolines,[f] and those of Mangia, who are 4000 miles[g] from one another, observe the same forms of salutation. They show their civility and respect by taking the hand or foot of the person whom they mean to honour, and drawing it gently along their faces.[h] Another mode of salutation, which prevails from the Sandwich Islands to New Zealand, is for the parties to bring the points of their noses into contact.

In almost every part of eastern Oceanica, the Polynesians receive strangers with grave songs, and present them with a branch of banana as an emblem of peace. The black race, on the contrary, most generally avoid all communication with strangers.

The same terms are applied to designate the same sort of national amusements. The words *tanger ifaifil*, in the Caroline Islands, signify, "the Female Complaint,"[i] the title of one particular form of public entertainment. In the Friendly Islands the same thing is called *tangee véfaine*.[k]

When we turn to the Marian Islands, we discover still more decided resemblances.[l] The society of the Arreoys[m] forms a most singular and infamous feature in the manners of Otaheite. These clubs of men and women, who make debauchery and infanticide fundamental laws of their body, present a phenomenon almost unique in the moral history of our species. Father Gobien tells us that there is a similar society in the Marian Islands. He says that the Uritoy are, among them, young people who live with mistresses without choosing to be connected by the marriage tie, and that they form a separate association. We know that the Otaheitans use a smooth pronunciation; and the word Uritoy, when the consonant T is suppressed, approaches to Arreoy or Erreoy, as the Otaheitan term is spelled by Mr. Anderson.

Capt. Cook observed in the Society and Friendly Islands three castes, the chiefs, the free proprietors, and the lowest people, or serfs. Gobien expressly says that the same division into three ranks is observed in the Ladrone Islands. In the whole of Polynesia, the nobility are incredibly proud, and hold the people in a degree of subjection of which it is difficult for the people of Europe to form an idea. The whole political condition of these islands calls to mind the laws and institutions of the Malays, and of the people of Madagascar. The case is the same with their notions of religion.

Among the Carolinians, some keep the bodies of their deceased relations in a small stone building within their houses, others inter them at a distance from their own dwelling.[n] Here we have an analogy with the Feiatookas[o] of the Friendly Islands, and the custom universal among these nations, of leaving the dead bodies to dry in the air. Their cemeteries are also inclosed in the same manner. The natives of the Society Islands strow around their burying grounds garlands of palm clusters and cocoa leaves, together with other objects particularly consecrated to funeral ceremonies, and near to which they also set down a quantity of food and water. The natives of the Ladrones, according to Gobien, feast round the tomb, which is always raised on or near the spot where the dead body is interred: it is covered with flowers, palm branches, shells, and every thing which the people esteem valuable. The Otaheitans do not bury the skulls of their chiefs along with the rest of the bones, but deposit them in boxes appropriated to that use. This strange custom is also found to prevail in the Ladrone Islands. Gobien expressly says, that they keep the skulls in their houses; that they put them in small baskets, and that the dead chiefs are the *Anitis* to whom the priests address their prayers. The opinions regarding a future state of existence have a general similarity among all these nations. They believe in the immortality of the soul, and in a heaven and a hell; but they do not consider these as places for the reward of virtue and the punishment of vice. In the creed of the New Zealanders, the man who has been killed and eaten by his enemy is condemned to eternal fire. The inhabitants of the Ladrones also consider hell as the destiny of persons who have died a violent death.

These striking coincidences cannot be the effect of mere chance. Taken in connexion with the affinity of languages, they lead us to the conclusion, that the inhabitants of all these islands have derived their customs and opinions from a common source, and are to be regarded as scattered tribes belonging to one nation,

[a] Third Voyage.
[b] Lettres Edifiantes, et Curieuses, t. XV. p. 312, 313.
[c] Third Voyage.
[d] Lettres Edifiantes, t. XV. p. 314.
[e] Cook's Third Voyage. Lettres Edif., t. XV. p. 207—315.
[f] The New Philippines and the Carolines are only different names for the same group. —See Book LVIII.—P.
[g] "1500 Fr. leagues."
[h] Cook's Third Voyage. Lettres Edif., t. XV. p. 208.
[i] "Complainte des femmes," lamentation of women.—P.
[k] Cook's Third Voyage. Lettres Edif., t. XV. p. 315.
[l] Histoire des Isles Marianes, par le Père le Gobien, liv. II. or an Abridgement contained in "l'Histoire des Navigations aux Terres Australes," t. II. p. 492—512.
[m] "Erreoy."
[n] Lettres Edifiantes, t. XV. p. 308 &c.
[o] Burying-places.

which had been separated at a period subsequent to the formation of their code of politics and religion.

But how shall we conduct our inquiries into the progress of that dispersion? Shall we believe, with Cook, Forster, and others, that it has taken place only in a direction from west to east? These navigators justly remark, that parties of savages in their canoes must often have lost their way, and been driven on distant shores, where they were forced to remain, deprived both of the means and of the requisite intelligence for returning to their own country. Instances of this have occurred within the knowledge of modern writers. In 1696, two canoes, containing thirty persons who had left Ancorso, were thrown by contrary winds and storms on the island of Samar, one of the Philippines, at a distance of 800 miles.[a b] In 1721, two canoes, one of which contained twenty-four, and the other six persons, men, women, and children, were drifted from an island called Baroilep to the island of Guam, one of the Marians.[c] Captain Cook found on the island of Wateoo three inhabitants of Otaheite who had been drifted in a similar manner, and the distance between the two islands is 550 miles.[d]

These facts are incontestible. But when we throw our eyes on the map, we perceive that these three parties of unfortunate sailors have all been carried by the prevailing currents and the trade winds to countries situated to the west of those to which they originally belonged. These examples, so frequently quoted, would therefore lead to an inference the reverse of that generally drawn from them. They would prove that Asia and Africa may have received colonies of savages from the Oceanian islands, but not that these islands had received colonists from the old continent.

In revolving this problem, we should believe these islanders to have proceeded from South America, were not that supposition destroyed by the total absence of any similarity in language, or in physical character.[e] We might again be tempted to suppose that they belonged to an ancient continent now buried in the sea, leaving these islands alone above the surface. But this hypothesis, which has been hazarded by an estimable scholar, only explains one difficulty by giving birth to many new ones.[f] Why should not this ancient people, in dispersing itself from east to west, have spread itself over the vast continent of New Holland, where we find only tribes belonging to the race of Negroes?

We consider the following as the best solution of this historical phenomenon. The large islands of Luzon, Celebes, Borneo, Java, and Sumatra, are inhabited by nations who speak languages bearing more or less affinity to that of the Malays, thus showing a common origin; yet some of them, such as the *Tagal* and *Bissay* languages of the Philippines, the *Balian* of the island of Bali, and that of the Battas of Sumatra, also differ so essentially from one another, that their national separation must have been of very ancient date. At the same time, we are informed that other ramifications of the Malay tongue are found in Madagascar, 3000 miles[g] west from Sumatra, and in the Society Islands and beyond them, nearly 7000 miles[h] to the east of the Moluccas. They are said to be enriched with a harmony of modulation and a diversity of grammatical forms which suppose some advancement in civilization. The same feudal government, the same manners, and probably the same mythology,[i] are found in countries thus distant. The conclusion which seems to follow is, that this language, these customs, and these institutions, were formed in the bosom of an ancient empire, a powerful nation, and one which cultivated maritime habits, but which has since fallen from its eminence, and been frittered down into detached local communities, unknown to one another.

But what was the seat of this Malayan Carthage? Every consideration shows that we must search for it either in Borneo, Sumatra, or Java. The first of these islands is little known. The second appears to the learned Marsden[k] to be the true country of the Malay nations. Without positively adopting or rejecting this opinion, we rather incline to believe that the country of Malayan civilization is to be sought in the island of Java.

In the first place, the historical traditions of the Malay colony established at Malacca make Java the seat of a great empire, from which that emigrant tribe had received its laws and its religion. The greater part of the Malay books are translations from the Javanese.

In the second place, the Malay language has a copious mixture of Hindoo or Sanscrit terms, which are particularly appropriated to religious and civil uses. These terms approach most of all to the *Kalinga* or *Telinga* language, spoken in Golconda and Orissa.[l] We might consequently expect to find this admixture following the order of local proximity. But we find the affinity with the Sanscrit to prevail chiefly among the Javanese, and most of all among the inhabitants of the mountains of Java. It is also in Java, and especially in the interior of that island, that we find the feasts and ceremonies of the Brahminical religion. The history of the Javanese makes the nation to descend from Vishnu.[m]

But at what epoch was Java the seat of a nation which, after being civilized by the Telinga Brahmins, colonized the shores of the vast Ocean? It certainly was prior to the introduction of Mahometanism; for that religion has not extended farther than the Moluccas: and the hog, an animal unclean in the eyes of the Mussulmans, has accompanied the Malay colonies to the remotest islands of Polynesia. It was probably prior to the travels of Marco Polo: for he seems to speak of this world of islands as already known and visited. On the other hand, the ancients, in the days of Ptolemy, were not acquainted with any civilized nation to the south of the *Sinaé*, (the Siamese of modern times.) The chronology of the Javanese goes no farther back than to a king of Pajajaran, who must have reign-

[a] Lettres Edifiantes, t. XV. p. 196.
[b] "300 Fr. leagues."
[c] Lettres Edifiantes, t. XV. p. 282, &c.
[d] "200 Fr. leagues."
[e] Forster's Observations on Physical Geography.
[f] Meiners, Recherches sur la Difference des Races Humaines.
[g] "1,100 Fr. leagues."
[h] "2,500 Fr. leagues."
[i] See afterwards our account of Otaheite, Bali, and other islands.
[k] Grammar of the Malay Language. London, 1812.
[l] Leyden's Memoir on the Indo-Chinese Languages.
[m] See afterwards our account of Java.

ed in the year 74 of the Christian era. Thus probabilities fix the foundation of the first Malay colonies somewhere between the fourth and the tenth century of our era.

A second migration of the Malays was occasioned by Mahometan fanaticism; and this migration, which is better known, took place in the twelfth and thirteenth centuries. Hence arise the palpable differences between the Malays of the coast and those of the interior.

The second great race of men belonging to Oceanica, is that which we have denominated the Oceanian negroes.[a] They are sometimes called the Papuan race. Compared to the Africans they are of a diminutive size, being about four feet nine inches high, and never exceeding five feet. Such, at least, is the account given by Mr. Crawford, of those whom he had an opportunity of seeing in western Oceanica. They have spare and puny frames. The skin is not jet black, like that of the African, but of a sooty brown. Sir Everard Home thus describes one who was sent to England by Sir Stamford Raffles to distinguish him from the African negro.[b] "His skin is of a lighter colour: the woolly hair grows in small tufts, and each hair has a spiral twist. The forehead rises higher, and the hindhead is less cut off. The nose projects more from the face. The upper lip is larger and more prominent. The lower lip projects forward from the lower jaw, to such an extent that the chin makes no part of the face, the lower part of which is formed by the mouth. The buttocks are so much lower than in the negro as to constitute a marked distinction; but the calf of the leg is equally high as in the negro." The description here given of the countenance corresponds exactly to a very striking plate of a New Hollander, prefixed to a short tract entitled, Dixon's Narrative of a Voyage to New South Wales.[c]

It is only indeed in exterior stamp that the puny negro of these islands bears any resemblance to the African, who, in vigour of frame and capacity for enduring labour, is superior to all other races, except the European. This is therefore evidently a distinct and an inferior race of mankind. Their dwarfishness and feebleness are not the effect of scanty food, or the hardships of their lot; for they do not attach to the lank haired races living in circumstances precisely the same. They have exclusive possession of some islands; yet have nowhere risen above the most abject barbarism. When encountered by the fairer races, they have been hunted like wild animals; and, incapable of retaining their ground, have retreated to the mountains and fastnesses. The people of New Guinea and some adjacent islands have been described by navigators as of more robust constitution. Forrest's account is less satisfactory than that of Sonnerat. This author describes them as a hideous race, rendered more disgusting by the prevalence of leprosy or elephantiasis, yet robust: he adds, that their hair is of a shining black, or a *fiery red*.[d] This last account, which cannot be correct, is regarded by Mr. Crawford as throwing discredit on the whole; and he thinks it probable that they are equally feeble with the negroes of western Oceanica.[e] To suppose that this race has emigrated from Africa is to do violence to all fact and reasoning, both on man and on the physical state of the globe. The different negro tribes of the Indian islands have different languages, and all completely different from those of Madagascar. The agreement between the languages of these two distant countries originates not in the negro languages, but in those of the men of brown complexion. The coincidences which occur in points of arbitrary custom are to be traced to the same source, and the mode of transmission must have been from east to west. The Oceanian negroes seem doomed to perpetual misery, and incapable of rising from the very bottom of the scale of humanity. They have been found hitherto incapable of acquiring the habits and feelings of civilized beings; and we cannot allow that, at any former period, they existed in a superior state of Society. This race is extended over New Holland, Van Diemen's Land, New Caledonia, the New Hebrides, New Britain, and Solomon's Islands, as well as New Guinea, where they go under the Malayan appellation of Papuas. Of these places they have exclusive possession, the Malays having either been expelled, or never permitted to settle They seem also to have once occupied the Moluccas and the Philippines; but in these places they have been partly destroyed and partly driven into the interior by the Malays. In the Philippines they are called *Ygolotes* and *Negritos*; in the Moluccas, *Haraforas* and *Alfureses*. Perhaps they are extended still farther. Their features seem to be recognised in the inhabitants of the Andaman islands, and in the Googos of Sumatra. A few straggling families inhabit the central parts of the peninsula of Malacca, where they lead the lives of hunters.[f] But the Biajoos of Borneo and the Battas of Sumatra do not, as has been erroneously supposed, belong to them. Even several tribes called Alfureses, such as those of Booro, seem rather to belong to the olive-coloured race.

Besides these leading races, Oceanica presents to the observer of human nature a few more unnatural and disgusting varieties of the species. In the island of Mallicolo, and in the neighbourhood of Glasshouse Bay in New Holland, the shape of the head approaches nearer to that of the ourang-outang than in other negroes. In the interior of Sumatra, there is a tribe which, from the large size of their heads and their small bodies, look like pigmies; and another, with long hair over the whole body, like the Ainos of Jesso. These deformities are often occasioned by hereditary disease. Thus the inhabitants of the island of Nias, off the west coast of Sumatra, have their bodies covered with scales, from a disease not unknown in Europe. The white leprosy,[g] in which the skin of the negro assumes a livid white hue, prevails among the Papuas of New Guinea, and also extends to the Malay race in the island of Java, where the subjects of it go under the name of *Kakerlaks*. In addition to these effects of preternatural change, the mixture of the olive with the negro race of Oceanians accounts for all the gradations found in this division of the world.

[a] See a Plate representing these two races in Crawford's History of the Indian Archipelago, vol. I.
[b] Crawford's History of the Indian Archipelago, vol. I. p. 24.
[c] Published at Edinburgh in 1822.
[d] Voyage à Nouvelle Guinée, par M. Sonnerat.
[e] History of the Indian Archipelago, vol. I. p. 27.
[f] Crawford's History, vol. III. p. 5.
[g] "Leucéthiopie."

BOOK LIV.

OCEANICA.

PART II.

NORTH-WESTERN OCEANICA.

A particular Account of the Sunda Islands; or Sumatra, Java, and Borneo.

THE first country which Oceanica presents, as we proceed eastward from the Indian Ocean, is the great island of Sumatra, known in some measure to Ptolemy, who seems to designate the point of Acheen under the name of *Jaba Diu*, the same as *Java Div*, or "the island of barley." The name *Samarade*, found in some editions of Ptolemy, seems to be a corruption of Sumatra. It was known to the Arabs under the names of Lamery and Saborma.[a] Marco Polo mentions some kingdoms and districts belonging to it. He calls it Little Java: some think that he thus contrasts it with Borneo, which was Great Java;[b] but the fact seems to be, that he had no conceptions at all of the comparative size of the islands, and, finding that Java was the most famous and the best known island in this archipelago, and that Sumatra was also a large island, concluded that Java was the largest, and Sumatra the next in order.[c]

This island, called by the natives Andelis, and perhaps Samadra,[d] is 1040 miles[e] long, from north-west to south-east; its breadth varies from 55 to 235.[f] A chain of mountains divides it longitudinally, running nearest to the western coast. The maritime parts, on both sides, are low and marshy. The main chain is accompanied by others of a secondary order. Four large lakes on the sides of these mountains, discharge their waters by rapid torrents, or magnificent cascades. The most famous of them is called Manselar. Mount Ophir was found, by the measurement of Mr. Nairne, to be 13,842 feet above the level of the sea. Several of the mountains are volcanoes. That of Ayer-Raya is 1377 feet above the sea.[g]

The soil is for the most part a fat reddish clay, covered with a stratum of black earth, often poor and barren. In the mountains have been found a reddish granite and marble.[h] Three fourths of the island, especially towards the south, are covered with an impenetrable forest. The gold mines had attracted the attention of the Dutch; but the German miners sent to Sillida declared the ore to be in a sparing quantity, and too difficult to work.[i] The Malays of Padang and Menangkaboo sell annually from 10,000 to 12,000 ounces of gold, which they collect principally by washing. The mines of Sipini and of Caye yield gold of eighteen and nineteen carats. There are excellent mines of iron and steel[k] in the interior. The steel of Menangkaboo is preferable to any in Europe. Tin, a metal found in so few countries, is an object of export. It is found chiefly in the neighbourhood of Palembang, on the east coast, being a continuation of the rich strata of the isle of Banka. The small island of Pulo-Pesang, at the foot of the mountain Poogong, consists almost entirely of one bed of rock-crystal. The soft rock called *nappal* seems to be a sort of soap-stone or steatite. Petroleum is also found at Ippoo, and elsewhere. It is chiefly used as a preservative against the ravages of the white ants. A great part of the sea-coast is surrounded with coral reefs.

Though situated under the equator, Sumatra is seldom subjected to a higher temperature than 85° of Fahrenheit, while in Bengal the thermometer rises to 101°. The inhabitants of the mountains are in the practice of lighting fires in the cold mornings. But frost, snow, and hail, are unknown. Thunder and lightning are frequent, and principally during the north-west monsoon. The south-east monsoon, which is dry, begins in May and ends in September; the north-west or rainy monsoon begins in December and ends in March. The climate of Sumatra has been too much decried. The west coast, which is covered with extensive marshes, may deserve the character of a pestilential shore,[l] in consequence of the unhealthy fogs to which it is subject; but many other parts of the island, especially the east coast, contain healthy situations, and afford examples of great longevity.[m]

The Malay Islands, though adorned with many rare plants and valuable trees, are, in general, ill adapted for cultivation. The facts stated by Mr. Marsden leave no doubt on that head.[n] The Sumatrans cultivate two kinds of rice. They extract oil from sesamum, and

[a] See our account of the history of Geography, Book XVI.
[b] Such is the opinion expressed in the original.—P.
[c] History of Geography, Book XIX.
[d] Valentyn's Description of Sumatra, p. 2. (Oostindien, VII.)
[e] "376 Fr. leagues."
[f] "20 to 85 Fr. leagues."
[g] Marsden's History of Sumatra, p. 8. 24.
[h] "Steatite, gray granite, and marble."
[i] Voyage of Benjamin Olitsch, counsellor of mines, by Elias Hesse, Dresden, 1690, (in German.)
[k] Properly, there are no steel mines.—P.
[l] "Has been called the plague coast, (côte de la peste.)"
[m] Radermacher's Description of Sumatra, § 7. in the Batavian Memoirs, (in Dutch.)
[n] Hist. of Sumatra, p. 19 and p. 59, &c.

EAST INDIA ISLANDS
CHINA SEA
PACIFIC OCEAN
INDIAN OCEAN
PHILIPPINE ISLANDS
MINDORO
SOOLOO SEA
CELEBES SEA
JAVA SEA
BANDA SEA
BORNEO
JAVA
SUMATRA
CELEBES
NEW GUINEA
BIRMAN EMPIRE
SIAM
CAMBODIA
COCHIN CHINA
GULF OF SIAM
STRAIT OF MALACCA
STRAIT OF SUNDA
Longitude East from the Greenwich
Boston Published by Samuel Walker

chew the sugar cane. They obtain a black sugar called *jaggari* from the *anoo* palm, which also yields sago, and, like other palms, an inebriating liquor. The cocoa is the chief dependence of the people for subsistence. Sumatra abounds in the most envied tropical fruits, such as the mangosteen, that celebrated wonder of the Indies, esteemed a universal remedy ;[a] the *durion*, the white pulp of which has a taste resembling that of roasted onions, and is of a heating nature ; the bread fruit, though not of the best quality ; the fruit of the *Yambo mura*,[b] which is shaped like a pear ; pine-apples, which, at Bencoolen, sell for a penny or two pence ;[c] guavas, lemons, citrons, oranges, and pomegranates.

The mountains of this island are richly enamelled with the finest purple and yellow hues, in an endless diversity of shades and forms, developed by numberless species of flowers. The *Soondal mallam*, or " fair one of the night,"[d] a funnel-shaped flower in this country, so called from blowing only during the night.

The most abundant native commodity produced for exportation, and the chief object of the European establishments, is pepper, the produce of a creeping plant, commonly called; from the analogy of its habit, the pepper vine. It begins in the third year to be productive, and continues so to the twentieth. There are two pepper harvests ; the great one in September, and the small one in March. A very small proportion of it is in the form of white pepper, the effect of a process for removing the external skin.[e f] Camphor is another conspicuous production, found in the form of a concrete crystalization in the body of the tree. The camphor tree grows spontaneously in the north of Sumatra, which is the warmest part of the island. It equals the tallest timber trees in size, and is often fifteen feet in circumference.[g] Each tree yields about three pounds of a light friable and very soluble camphor, which wastes on exposure to the air, though much more slowly than that of Japan. The oil of camphor is the produce of a different tree. Benzoin is a resin obtained from a tree resembling the pine.[h] Cassia, a sort of coarse cinnamon, is found in the interior.

Rattans grow chiefly on the eastern side of the island, from whence they are exported in large cargoes to Europe for canes. Besides the herbaceous and the ligneous cotton, the silk cotton, *Bombax ceiba*, is to be met with in every village. In appearance, this is one of the most beautiful raw materials which the hand of nature has presented. Its fineness, gloss, and delicate softness, render it to the sight and touch much superior to the produce of the silk-worm ; but such are its brittleness and shortness, that it is esteemed unfit for the reel and loom, and only applied to the humbler use of stuffing matrasses and pillows. Yet it is not impossible that farther experiments may find it capable of being adapted to a superior manufacture. The tree is remarkable for the straightness and the perfectly horizontal growth of its branches, three always growing together and forming equal angles. The subordinate shoots also grow in the same manner, and all the gradations of the branches observe the same regularity to the top. Some travellers have called it the umbrella tree.[i] Mr. Marsden compares it to the piece of furniture which we call a dumb waiter, consisting of a gradation of circular shelves on one axis.[k] The coffee tree is planted in great numbers ; but the produce is rendered indifferent by unskilful management. The plants are set too close together, too much shadowed by other trees, and the berries are gathered while they are red, and before they have been sufficiently ripened to acquire the proper flavour. Ebony trees are in great plenty. Sandal wood, and the celebrated eagle or aloes-wood, are the produce of this island, but they have lost much of that high reputation which they had among the early writers. There is excellent timber for ship-building, but, for want of rivers, it cannot be conveyed to the coast. Teak is scarcely to be met with, except where it has been recently planted. The *rangee*, or machineel, which is rendered useful by its property of resisting the ravages of the white ant, is found in this island. Iron-wood, and other useful species, are also found ; among which is the elegant *camooning*, resembling in its leaves the larger myrtle, and yielding a beautiful wood, susceptible of an exquisite polish, and much used for the sheaths of *kreeses*. The celebrated banyan tree also grows in this island, and, besides its other singularities, was remarked by Mr. Marsden to spring readily from the trunks of other trees, after they had become hollow by age, though still in vegetation, from brick walls, and even from the smooth surfaces of painted wooden pillars, where its seeds have been lodged by birds or other modes of conveyance. The fibres which hang from the branches, and which, when they reach the ground, readily and spontaneously take root, are observed to assume curious fantastic forms wherever obstructing substances are placed in their way ; so that living wicker works, of any form, may be produced by merely furnishing them with a mold.[l]

The horses are small but well made and hardy. The cows and sheep are of middling size ; the latter are probably of the Bengal breed. The buffalo is used for some domestic labours. The forests contain the elephant, the royal tiger, the rhinoceros, the hippopotamus, the black bear, which eats the kernel of the cocoa-nut, the otter, the porcupine, the deer, the wild boar, the civet cat, several species of monkeys, particularly a bearded monkey, the *simia nemestrina*, which seems to be peculiar to this island.

Among the numerous birds, the *coo-ow*, or Argos pheasant, is remarked for its uncommon beauty, but no complete specimen of it has been seen in Europe. Its

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[a] Rumphius, Hortus Amboinensis, Vol. I. p. 132. tab. 13, &c.
[b] Eugenia jambos.
[c] " Two or three sous."
[d] " L'arbre triste ou belle de nuit."
[e] Owing to the indolence of the Sumatrans, only a small portion of it is converted into white pepper, by stripping the ripe grains of their external covering."—M. B.—P.
[f] Marsden's Hist. of Sumatra, p. 118. Elias Hesse, p. 208. Eschelskron, p. 59.
[g] Valentini, Historia Simplicium, p. 488. tab. 7.
[h] " Benzoin is obtained from a species of fir or pine (Sapin)." This is a mistake. It is obtained from the Styrax Benzoin, a tree arranged by Jussieu, in the Guaiacanæ, along with the ebony and persimmon, and not at all connected with the pines.—P.
[i] " L'arbre à parasol."
[k] History of Sumatra, p. 127.
[l] Marsden, p. 139

plumage is said by Mr. Marsden to be the richest of all the feathered race, yet without any degree of gaudiness. When caught it cannot be kept alive longer than a month. It has an antipathy to the light, being inanimate through the day, and uttering in the night a harsh cry like that of the peacock. Poultry[a] are in great abundance, and in the southern parts there is a very large species, known also at Bantam.[b] The *Ardea argala*, the largest known species of the heron, which is also known in India, and in the south of Africa, is a native of this island. The *angang*, or rhinoceros bird, is found here, remarkable for having a kind of horn projecting from its bill; perhaps it is a species of cassowary.[c] The rivers are infested with crocodiles, and stocked with a great variety of fish. The house lizard is in great abundance, and remarkable for being the largest animal capable of retaining its hold so as to walk in an inverted position. Its body has such a degree of transparency as to allow the circulation of the fluids to be distinctly seen through the integuments. Insects are abundant, as in all hot climates, and among others the destructive white ant.[d]

The natives divide Sumatra into three countries. *Balla*, in the north, includes the kingdom of Acheen,[e] (or Atcheen,) with the vassal principalities of Pedeer, Passay,[f] and Delli. The interior of this division is inhabited by the Battas. It is bounded on the east side of the island by the river Siak, and on the west by the river Sinkol. The second division is the ancient empire of Menangkaboo, comprehending the kingdoms of Jamby and Andragiri on the east coast ; in the interior the country of the Rejangs, and part of the present empire of Menangkaboo ;[g] and on the western coast the countries of Baroos, Tappanooly, Natal, and others ; the late Dutch possessions of Priaman, Padang, and Silhda, with the kingdom of Indrapoora. The third division, called *Ballum-ary* or *Kampang*, embraces the south-eastern part of the island, where we find the kingdom of Bancahoolo or Bencoolen, with an English establishment, the country of the Lampoons, and the large kingdom of Palembang.[h]

Acheen is the only kingdom of this island the transactions of which have been deemed sufficiently important to occupy the attention of historians. It is situated at its north-western extremity. It formerly reached as far south as Indrapoor on the west coast, but now extends no farther than forty or fifty miles along both the eastern and the western shore ; Carty, near Batto-Bara river, being its boundary on the former, and Baroos on the latter. The subject inhabitants of the interior form three tribes, two of which, called Allas and Reeah, resemble the Acheenese, and the third, called Carrow, come nearer in manners to the Battas. The capital, Acheen, stands two miles from the mouth of a river, which admits no vessels during the dry monsoon. It carries on a considerable trade with the natives of the coast of Coromandel, who bring hither their cotton manufactures, and carry home gold dust, sapan wood, betel-nut, patch leaf, (the *Costus Indicus,*) sulphur, and benzoin. From six to ten Telinga snows, of 150 or 200 tons, come annually. They are prohibited from touching at any other port on the east or west coast. This is a precaution for securing to the monarch the profits of the trade, the customs, and the presents usually made. The king is the chief merchant of the capital. The people carry on the subsequent business of distributing the goods through the different parts of the kingdom. In this neighbourhood there is a volcano, from which sulphur is procured. The Acheenese are darker coloured, and stouter than the other Sumatrans.[i] They have a greater portion of sagacity and of industry. The mercantile transactions of those not connected with the capital are conducted on a more liberal scale than in many other places. The religion is Mahometanism, and they have a great number of mosques and priests. The city contains several public buildings, but none of them elegant. The king's palace is a rude piece of architecture, surrounded with strong walls built for protection, but without the least attention to the modern principles of fortification. There are some cotton and silk manufactures in this country. The seamen are expert and bold, and carry on a constant and successful fishery. Having no coin, they make their payments in gold dust, which they keep in divided parcels contained in pieces of bladder, and these are weighed by the person who takes them in payment. The government is a hereditary despotism, subject to frequent revolutions and intervals of anarchy. The sultan, in issuing his orders, first makes them known to a woman seated at his feet ; she communicates them to a eunuch sitting next to her, and he to the *Cajoorang-Gondong*, an officer who proclaims them aloud to the assembly. The throne is of ivory and tortoise shell. Ambassadors, and other strangers introduced to the sovereign, are rigidly subjected to certain ceremonies, which are rather troublesome than degrading, and they are treated with pompous hospitality. The country is wonderfully populous ; the accounts of the population given by the people themselves are incredible, and believed to be exaggerations. The king hardly receives any land revenue : each proprietor is only obliged to give a measure of rice annually, which he carries in person to the court, but which seems rather intended as a mark of homage than a substantial tax. The king's revenues arise entirely from the customs on exports and imports, which amount to about 2500*l.* a-year. The kings of Acheen, besides their proper territories, possess a grant along the sea coast as far as Bencoolen, from the sultan of Menangkaboo, whose sovereignty in these parts they acknowledge. The criminal laws of Acheen are particularly severe,

[a] "Poules d' Inde" not *turkeys*, in the present instance, although rendered so in the French Dictionaries. The concluding part of the sentence proves this.—P.

[b] The Paduan cock, *Gallus giganteus*, found wild in the forests of Sumatra and Western Java. It is very tall, and in its caruncles and plumage resembles the common cock, of which it is twice the size. It is now domesticated in Europe.—P.

[c] This is given in the form of a question, in the original. But it is a very singular question, since it is well known that the rhinoceros bird belongs to the genus Buceros, which has no affinity with the cassowary, but resembles, in its habits and appearance, the raven ; hence it has been called *the horned Indian raven*.—P.

[d] Termes.

[e] Achem.

[f] "Péder, Pacem."

[g] "Le reste (the remains) de l'empire," &c.

[h] Radermacher, Description de Sumatra, p. 9, &c.

[i] The Acheenese are not Malays. They speak a peculiar national language, like the Battas, Rejangs, and Lampoons.—*Missionaries at Sebolga, in the Batta country*.—P.

and fall almost exclusively on persons in the lowest walks of society ; mutilation and drowning are the most common punishments. The robbery of a priest is punished with burning alive. An adulterer is encircled by a ring of his countrymen, and furnished with a weapon, by the aid of which he is welcome to make his escape if he can break through any part of the ring, after which he is liable to no further prosecution; but he is most generally cut to pieces in the desperate attempt. The Acheenese, however, are represented by travellers as the most abandoned and unprincipled nation of the east. Their treacherous and sanguinary character was amply exemplified in their early transactions with the Portuguese. To these visiters, indeed, they owed little delicacy, nor could they profit in humanity by their example ; but their conduct to one another was also marked by every feature that can render man an object of distrust and abhorrence to his neighbour.[a]

The country of the Battas[b] comprehends the mountains of Deirah and Papa, to the south of the plain of Acheen.[c] It is bounded on the south by Passamman, and the independent district of Aru. The northern extremity is abreast of the great river Sinkel, and the southern a little beyond that of Tabooyang. The country is very populous, but the greater part of the people live at a distance from the sea-shore, in extensive plains, between two ridges of mountains on the borders of a great lake. It is divided into several districts, which are subdivided into tribes. The English settlements connected with it are at Natal and Tappanooly. A large quantity of gold is procured from the country, and there is a considerable sale for imported goods. The English live on good terms with the natives, but the people are too spirited to allow them any political influence. The settlement in Tappanooly Bay is on a small island called Punchong-cacheel, which has one of the most advantageous harbours in the world, and would be of vast importance if it were not so remote from the general track of shipping. The bay is very complicated, and stretches into the heart of the Batta dominions. The natives trade with the Europeans, and their conduct is inoffensive. The English have sometimes gone in small parties to gratify their curiosity in the interior, and on such occasions are treated with respect and hospitality. High up on the river Battoobara, which flows into the straits of Malacca, there has been discovered a large brick building, in the form of one or more squares, with a very high pillar at one corner. Images, supposed to be Chinese josses or idols, are carved in relief on the walls, but no tradition is preserved respecting the erection of it. The Battas are of lower stature and fairer complexion than the Malays. Their dress is of coloured cotton. The covering of the head is generally of the bark of a tree. The women wear rings of tin in their ears, sometimes to the number of fifty in each. Their ordinary fare is maize and sweet potatoes. Rice is confined to persons of distinction. It is only on great occasions that cattle are killed for food ; but they will eat a part of any dead buffalo, alligator, or other animal they chance to meet with. The rivers are too rapid and too much interrupted by water-falls to have many fish, except near their mouths. They delight most of all in horse flesh ; and the best horses are carefully fed and rubbed down for the table. Their houses consist of wooden frames, which are boarded and roofed with a vegetable substance called ejoo, resembling horse hair. Their *campongs*, or towns, consist of about twenty houses : each house consists of a single apartment, which is entered by a trap door in the middle, and opposite is an open shed where they sit during the day. Each *campong* has a hall for public business, and the reception and entertainment of strangers. Polygamy is freely practised. The wives sit in different corners of the same apartment, and have their separate establishments for cookery ; but their respective rights and duties are sufficiently understood to obviate the heart-burnings and jealousies which are usually imputed to the harems of the east. They are represented as a sort of slaves. They perform the labours of agriculture. The men, when not engaged in war, lead indolent lives, passing the day in playing on a kind of flute, which they deck with garlands of flowers. Their music is rather better than that of the other Sumatrans.—They are much addicted to gaming. A man who is unable to pay his gambling debts is liable to be confined and sold as a slave, unless released by the generosity of the winner. They are fond of horse-racing. They use no saddles. Sometimes the bit is of iron and the reins of rattan ; at other times the bit is of wood and the reins of ejoo. They have a peculiar language and a peculiar written character, and the majority of the people can both read and write. The bark of a tree is used among them for paper. In their mutual dealings they are strictly honest, but pilfer readily from strangers, when they are not restrained by the rules of hospitality. Adultery in men is punished with death ; in women it is only followed by the disgrace of having the head shaved, the weaker sex being looked on as less accountable for their actions. The Battas practise cannibalism in the punishment awarded to particular crimes. This fact is established by abundant and unquestionable evidence. The intention of it is to testify their detestation of crime, and inflict the greatest possible ignominy on the victim. It is sometimes also extended to prisoners of war. The sufferer is first killed by lances thrown at him by the people, who, when a mortal wound is given, run up to him in a rage, cut pieces from the body with their knives, dip them in salt and lemon juice, lightly broil them, and swallow them with savage enthusiasm. This is not accompanied with any intention of giving pain to the sufferer, and therefore, though ferocious and inhuman, cannot, when rationally viewed, excite so much detestation as the refined tortures by which some nations prolong the sufferings of obnoxious individuals. An English gentleman, who lately made some inquiries into the manners of these people, asked them if there was any part of the body which was usually preferred to the rest. They told him jestingly, after a little thought, that the palms of the hands and soles of the feet were the best eating.[d]

[a] Marsden's History of Sumatra, p. 311—370.
[b] Batak.
[c] It extends from 0° to 2° 30′ N.—P.
[d] A MS. letter from a British officer, read before the Wernerian Society of Edinburgh, 1822.

The Batta country is divided into a number of petty communities, governed by rajahs who are generally independent. In some instances there are gradations among them. The people have a permanent property in their possessions, and sell them to one another when so disposed. This is probably one cause of the comfort and prosperity which they are observed to enjoy in a greater degree than most of their neighbours. They entertain a superstitious veneration for the sultan of the neighbouring kingdom of Menangkaboo. They submit blindly to his emissaries, even when insulted, imagining that if they offered to resist they would cease to thrive, and their crops and their cattle would be ruined by some mysterious spell. They often go to war with one another, and carry on the contest not by open or general engagements, but by petty hostilities, waylaying individuals of the hostile tribe. Before declaring war they use the solemnity of firing with gunpowder without shot into the campong of the enemy, and give a certain time for proposals of reconciliation before they commence actual hostilities. Their arms are matchlocks, bamboo lances, and a sort of sword or large knife. They carry no kreeses like the Malays. They manufacture their own gunpowder. They believe in a good and an evil deity.—On their belief in a future state accounts differ. Marsden says they have no such idea. They are credulous in matters of sorcery and prognostication, and take oaths with vehement solemnity. The priests predict the event of a war by inspecting the intestines of a dead buffalo; but if their predictions are not verified, they are sometimes put to death. The body of a deceased man of rank is kept in a coffin for several months: the soft parts, dissolving during that interval, are conveyed in a fluid state by a bamboo tube from the bottom of the coffin into the earth. This people has remained separate from the other races partly in consequence of the absence of gold and other articles of traffic to tempt the rapacity of conquerors and the speculations of traders. Their marriages are accompanied with some singular ceremonies. The intended bride appears undressed before the man in a bath, after which he makes his bargain about the sum of money which he is to give to her relations. The young couple partake together of two sorts of rice, and the father of the woman throws a piece of cloth over them.

On the west coast, adjoining the Batta country, to the south, is a populous territory, called Passaman, an independent Malay sovereignty, governed by two rajahs, formerly subject to Menangkaboo. The Dutch have a factory at Padang, to which they were probably attracted by the quantities of gold found near it. About 10,000 ounces of gold are annually exported from the west coast of the island. To the south of Padang is Indrapoor,[a] once the seat of a considerable monarchy, from the ruins of which sprung that of Anac-soongey, the capital of which is a small place called Moco-moco. —Next to this is the country of the Rejangs, who live under chiefs called Panjerans, whose power is very limited. They have adopted Malay civilization, and yet preserved their primitive character and manners. They are small lean figures. Their noses are artificially flattened, and the lobes of their ears distended. Their eyes are black and lively. Their women bear a resemblance to the Chinese. Their complexions are rather yellow than brown or copper-coloured. Their mountaineers are extremely subject to goitres. A little to the south, in 3° 16′ south latitude, is Bencoolen, a Malay town, near which is the English presidency of Fort Marlborough. Here pepper and sugar cane are cultivated, but the produce does not pay the expenses of the government.

In the centre of the Island is Menangkaboo, extending partly to the northward, but mostly to the southward of the equator. It is the chief seat of empire of the island, formerly extending over the whole, and held in high respect in the east. At present, its longest diameter does not exceed 100 miles, and probably falls much short of it. The capital is called Pangarooyoong.[b] The sultan's power is greatly limited, and is chiefly founded on a superstitious veneration, in which he is held as a sort of Mahometan pontiff. It is supported by the priesthood, but very little submitted to by persons possessing any military power beyond a very limited territory. The titles which he assumes in the preambles to his edicts, are absurdly pompous, containing a minute enumeration of his wealth, and the mysterious power of his military weapons. The people have no records or annals. They write expertly in the Arabic character; but their whole literature consists of transcripts of the Koran and bold historic tales. They are famous for composing songs called *pantoon*. The arts are carried to greater perfection among them than among the other natives of Sumatra. They are well skilled in the manufacture of fillagree. They have, from the earliest times, manufactured arms for their own use, and for sale in the northern parts of the island. They use lances, kreeses, and various side arms. The kreese has a blade fourteen inches long. It is not polished, but has a waving surface, resembling that of an imperfectly mixed metal; it has several serpentine bends. The handle is of ivory or some beautiful polished wood, finely carved and ornamented. The sheath is made of a hollow piece of beautiful wood. They used to go frequently to war with the Acheenese, but the modern English settlement at Natal operates as a check on that warfare, the settlers in that locality having placed themselves under the protection of the English Company. The people of Menangkaboo differ from the other inland inhabitants, in being all Mahometans, having been converted at a very early period. The capital is the resort of pilgrims of that religion.

A province called Tigablas Cottas yields a very pure gold,[c] and contains a great lake called Dano. In the interior the Googons,[d] a wild and hairy race resembling ourang-outangs rather than men, dispute with the lower animals the dominion of the forests.

The Lampoon country is a portion of the southern extremity of the island, consisting of mountains covered with impenetrable forests and plains which are subject to frequent inundations. The people resemble the Chinese more than any of the other Sumatrans. They

[a] "Indrapoura."
[b] "Pangarayoung."
[c] "The province of Tigablas Cottas yields 500 marcs of gold, of 22 carats."—M. B.—P.
[d] Googos or Googoos.

have a guttural language, and a character peculiar to themselves.[a] They are a hospitable and unwarlike race, using no fire-arms, and are not a match for the Javanese banditti, by whom they are much molested. Their manners are more licentious than those of the other Sumatrans. They have public dances called bimbangs, where the young women exchange their ordinary for their dancing dress, letting the one drop off dexterously, as the other is brought down over the head. They have canoes formed of the hollowed trunks of single trees, and large enough to carry 13,000 pounds weight.

The kingdom of Palembang, an ancient dependence of the Susuhunam, or emperor of Java, is mostly peopled by Javanese. It has, in recent times, come under the protection of the Dutch government at Batavia, which has a factory in the country, procures from it pepper and tin, and makes it a mart for vending opium and other commodities from the west of India. It comprehends the south-east portion of Sumatra, and the islands of Banka and Billiton. Both in Banka and in this part of Sumatra, there are tin mines; and that metal is always purchased with silver, for which there appears to be no efflux from the country. Hence probably arose the accounts given of the immense wealth of the king of Palembang. But to all appearance both the chiefs and people are miserably poor. There is said to be a remarkable increase of land in this kingdom, by deposition from rivers and from the sea. Ill cultivated, and covered with forests, this country exports, in addition to the other productions of Sumatra, sassafras, dragon's blood, and excellent timber. The climate is liable to many abrupt changes of temperature, yet not unhealthy.[b] The large city of Palembang is inhabited by Chinese, Siamese, Malays, and Javanese, but the only stone buildings in it are a temple, and the royal castle. The despotic sovereign, without a regular army or a fixed revenue, indulges his pride and his effeminacy in the midst of an ample seraglio. The male inhabitants of Blida, from being extremely stupid and phlegmatic, have the exclusive privilege of being admitted within the walls of that building, where they act as water-carriers. The laws here are without influence, the judges void of honour, and the merchants destitute of honesty. The Mahometan priests engage in trade, and not without success. The thieves, who are called Sumbaraws, live in a community legally acknowledged, under a leader who restrains their excesses, and keeps up the police.[c] Here, as in the whole island, the Malays wear a vest, and a kind of mantle, with a girdle in which the kreese is thrust. They wear very short trowsers; the legs and feet are naked. The head is covered with a pretty handkerchief, over which they put a broad hat when they travel. Both sexes file and blacken the teeth. Their houses are of wood and bamboo, covered with palm leaves, raised on pillars, and entered by an ill made ladder.

The interior contains some negroes, with uncommonly large heads, short bodies,[d] and very slender arms and limbs. M. Radermacher saw some individuals of this race at Palembang

The island of Banka, off this coast, is 130 miles long by 45 broad. It has tin mines in different places, which were discovered accidentally in 1710, by the burning of a house. They are worked by 10,000 resident Chinese. Navigators have considered the climate as one of the most deleterious in that part of the world. This observation, however, applies only to the immediate neighbourhood of the sea. The island was ceded to the British in 1812, and being thinly peopled, in proportion to its soil, is recommended by Mr. Crawford as a good station for an English colony; but it was given up to the Dutch by the treaty of peace in 1814, in exchange for Cochin, on the coast of Malabar. On the east of Banka lies the round-shaped island of Billiton, separated from the former by Clement's straits, through which the vessels bound for China pass, after passing those of Sunda.[e] It is the only place, in this whole archipelago, that contains iron mines which are worth the working.

Jamby, on a river of the same name, to the north-west of Palembang, was formerly a place of note, and both the English and Dutch companies had establishments there; but the system of oppression and monopoly which they brought along with them issued in their poverty and ruin. There are many other petty Malay states at every large river on that side of the island; but the extent of their respective powers is little known, being frequented only by the Moorish vessels of Telinga. Private trading ships from Bengal sometimes dispose of a few chests of opium, but seldom venture on shore, so great is the antipathy to them entertained by the natives. They are generally at war with the inhabitants of the interior, who confine them to the sea-coast. The chief of these states are Indergerie Siak,[f] from which the best sago is obtained, and Batoo-Bara. The river Racan, in the Aru country, so often mentioned by the Portuguese historians, is so rapid, and attended with so great a swell, as to be unfit for navi gation.

The whole of the shore, from the Straits of Sunda to Diamond Point, is very low land, mostly covered with woods, and few or no mountains are in sight of the shore. From Diamond Point to Acheen, there is a gradual slope to the foot of a range of high hills, and the lands are well cultivated.

A multitude of islands, of different sizes, lie between this shore and the peninsula of Malacca. Pulo Lingen is an irregular island, fifty miles long, by thirty in breadth, having a remarkable two-peaked mountain in the centre, called by sailors the "Asses Ears." It is held by a piratical chief, and much frequented by pirates.

The island of Sincapore has, within these few years, been occupied by the English, and constituted a free port, in consequence of which it has acquired great importance with unexampled rapidity. When the British flag was hoisted by Sir Stamford Raffles, it was almost unoccupied, the population not exceeding 200 souls. In three months it increased to 3,000, and it now ex-

[a] "The Lampoons resemble the Chinese in their eyes and features, (yeux bridés et visage en losange;) they speak a peculiar idiom, full of guttural sounds." M. B.—P.
[b] Radermacher, p. 131.
[c] Radermacher, sect. 115.
[d] "Une taille de pygmée," of a pigmy size.
[e] Fleurieu, Voyage de Marchand, II. p. 107, &c.
[f] "Andragiri, on a large river of the same name"

ceeds 10,000, consisting chiefly of Chinese. No less than 173 vessels, principally native, arrived and sailed in the first two months. The Malays to the east, entertaining a great objection to pass the Straits of Malacca, are encouraged by this emporium to exchange their commodities for the productions brought thither from the west. The English flatter themselves with the hope of vending through this medium an immense quantity of their manufactures among the natives of north-western Oceanica.[a]

The islands on the west of Sumatra form a regular chain. The isle of Nyas, very fertile and populous, is nhabited by a singular race, distinguished by a skin of a whitish appearance, covered with scales, and by ears of uncommon length.[b] A great trade is carried on between it and Natal. The articles received from it are rice and slaves; of the latter, 450 are annually bought, besides 150 which go to the northern ports; and in the act of kidnapping them, the chiefs destroy about 200. These facts illustrate the exuberant tendencies of the population. They are remarkably ingenious in handicraft work. Their language and manners resemble those of the Battas. They cannot pronounce the letter P. Their principal food is pork. They are said to be revengeful in their temper; but that character is chiefly founded on their being reckoned dangerous inmates in the situation of domestic slaves.—The Nassau, or Poggee[c] islands, consist of rocks and mountains covered with forests to their tops, and affording excellent timber. Sago grows on them in great abundance. The inhabitants do not cultivate rice, but cocoa-nuts and bamboos are in great abundance. The islands contain red deer, hogs, monkeys, a few tigers, but no buffaloes or goats. The inhabitants, in number 1,400, are a tall copper-coloured people, similar to the Otaheitans both in aspect and in simplicity of manners. They are in the habit of tattooing their bodies. Polygamy is unknown among them, but chastity among the unmarried is scarcely esteemed a virtue. They believe themselves to be descended from the sun.[de] Enganno,[f] or Deceitful Island, has been represented as inhabited by a race of cannibals. Charles Miller landed on it, and found the natives rude and simple. They are tall and copper-coloured, living in circular huts standing on pillars of iron-wood.[g] Their food consists of cocoa-nuts, sweet potatoes, sugar cane, and dried fish.[h] It has been said that they lived on rock lichens,[i] a thing not at all improbable.

The celebrated Strait of Sunda separates the island of Sumatra from that of Java. The navigator coming from the Indian ocean, with Sumatra on his left, and Java on his right, soon sees the great island of Borneo right a-head. Hence these islands have been called in French, *isles de la Sonde*, or "the islands of the Sound." The word Sunda seems to be of Sanscrit origin, and as such, bears a resemblance to the Danish word *Sund*, and the English "Sound," one of those numerous coincidences, to the existence of which we have on former occasions adverted.[k l]

The Island of Java, the seat of a great and flourishing native empire, the centre of the power of a commercial company which lately ruled all the eastern sea, is worthy of a more extended description than the limits of this work will allow. This island commands by its situation the principal entrances of the seas of Eastern Asia. In size it is inferior to Borneo and Sumatra, being only 690 miles[m] long, and varying in breadth from 80 to 140.[n] Its superficial area is about 18,560 square miles.[o] The name Java[p] is Malay, and signifies, according to some, "the great island," according to others a particular grain which grows on it.[q] The Arabs and Persians called it *Djezyret al Maha-Radje*, "the island of the great king."

According to Valentyn's large map, this island is traversed from east to west by a chain of mountains which generally lie nearest to the southern shore. In some parts there is a double chain, containing between them elevated table lands, such as those in which Priangan and Mataram are situated. The most westerly part presents a lower terrace.[r] The high mountains begin straight south from Batavia, and are called the Pangerannan,[s] or "Blue Mountains."[t] Between Cheribon and Mataram, in the narrowest part of the island, the highest mountains are collected, the Gonnong-Kandang, Toorenterga, Tagal, and Keddo;[u] farther east, the two brothers, or Soodara-Soodara, Mount Loovon, Domong, Japan, and others, continue the chain to the eastern extremity. The plains on the coast consist of a reddish clay of little fertility, a black rich clay, and a barren yellow till. About three miles from the shore are the limits of the alluvial land, formed of sand, mud, and shells.[x] The mountains, covered with trees and herbs, and enriched with a varied cultivation, exhibit a most agreeable prospect. Among the volcanoes of the island, (for scarcely any islands in this part of the world are without volcanoes,) that of Geté is reckoned 8000 feet above the level of the sea.

The northern shore of Java is considered as extremely unhealthy. Yet the heat is no way insupportable. At Surabaya, the thermometer rises to 92° or 93° of Fah-

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[a] See the Report relative to the Trade with the East Indies and China, printed by order of the House of Commons, 1821, p. 194—205, and 383.

[b] Radermacher, p. 71.

[c] Usually written Poggy. —P.

[d] "They claim to be descended from the sun."

[e] Asiatic Researches, vol. VI. p. 77. Annales des Voyages, t. I. p. 117.

[f] Engano, deceit, in Portuguese.—P.

[g] "They live in huts of a circular form, supported on a pillar of iron-wood."—M. B.—P.

[h] Bibliotheque Britannique, No. 147. p. 203.

[i] Radermacher, p. 78.

[k] See p. 308, of this volume. See also, p. 515.

[l] In the two last sentences, the translator has deviated considerably from the original, as the following literal rendering will show. "Hence the common denomination of Sunda Islands, *(Isles de la Sonde,)* given to these three countries, an insignificant appellation, but about which it is useless to cavil. The word *Sunda* seems to be derived from the Sanscrit *Sindu*, signifying sea, river, or any large body of water, and has an apparent affinity with the *sund* of the Danish, and the *sound* of the English languages." We see from this that *Sonde* is only the French orthography of *Sunda*, and has nothing to do with *Sonde*, sound.—P.

[m] "250 Fr. leagues."

[n] "30 to 50 Fr. leagues."

[o] "6700 sq. Fr. leagues."

[p] "Djava," Djawa.

[q] Valentyn, Description de Java, p. 64—66, (Indes Orientales, t. V.)

[r] The western extremity of Java is a lofty promontory, formed with perpendicular rocks, in which are numerous caverns, abounding in edible bird's nests. It is called Goenong-Pajong.—P.

[s] "Pangerangon."

[t] Valentyn's Map, sheet 2d.

[u] Idem, sheet 4.

[x] Mem. de Batavia, I. p. 24—190, &c.

renheit,[a] in the dry season, but between noon and midnight there is a difference of 24 or 28 degrees.[b c] The fatality of Batavia, Samarang, and some other places, to European constitutions, seems to arise in a great measure from the marshy lands, the stagnant water of numerous canals, the excessive number of trees, and general want of cleanliness.[d] At Batavia an earthquake in 1706 produced a bar which dams up the water of the river.[e]

Thirty miles[f] from the sea there are hills of considerable height, where the air is fresh and healthy. The plants of Europe, particularly strawberries, grow very well: the inhabitants are vigorous, and have healthy complexions. To these situations invalids are sent, and are found soon to recover. The whole of the interior has similar advantages. At Soora-Karta, where the emperor of Java resides, the air is highly salubrious to strangers, and the waters of the limpid rivulets are good and pure.[g]

The very circumstances which render Batavia and its vicinity unhealthy to man, render it the most propitious locality to vegetation. The rice crops are of the greatest importance. The cultivation of this article, and indeed all the branches of husbandry, are conducted with more intelligence and neatness by the Javanese than by the Hindoos, and greater facilities are afforded for increasing their amount by irrigation, in consequence of the numerous rivulets superseding the necessity of such enormous tanks as form the sole dependence of many agricultural districts in continental India, and enabling the natives to accomplish every purpose by canals and drains. No manure is applied to the land, either here or in any other island of this archipelago, nor is any advantage sought from particular rotations of crops. Next to rice, the most important produce is maize, bearing a relation to the former similar to that which oats or barley do to wheat in Europe. Mr. Crawford differs from Humboldt in considering this as an indigenous product, and not consequent on the discovery of America. The name of it bears no analogy to any American term, although it is found that all exotics in this part of the world either preserve their native name, or others which point to their origin.[h] The yam (*Dioscorea alata*) has been cultivated in this part of the world from time immemorial, in many varieties, and seems to be indigenous. Sometimes it attains a weight of forty or fifty pounds. It is less cultivated in Java however than in the poorer islands, where the *cerealia* are more scarce. The sweet potato, and the European potato, are of very good quality. There are several leguminous species, such as beans, lentils, kidney-beans, and Angola peas, and all the culinary European plants; also the white Chinese radish, and the fruit of that species of *solanum* which is called the egg plant. Capsicum grows both in a wild and cultivated state, and is much used by the natives, who have no relish for black pepper, and those other spices of their own climates which are so much relished by all foreign nations. The cocoa tree is cultivated as an article of food; a little oil is pressed from it which is highly esteemed. The most valuable nut, especially considering its adaptation to poor soils, is the *Arachis hypogæa*, or ground pistachio-nut, yielding an abundant product of expressed oil, while the leaf of the plant makes, like clover, excellent feeding for cattle, and the oil cake is used as dressing for the land.

The areca or betel nut, a graceful slender palm, grows here abundantly; also the Gomuti palm, (*Borassus gomutus*,) affording the principal supply of that saccharine liquor which yields sugar by evaporation, the only sugar used by the natives; and which, when fermented and distilled, is converted into toddy and into spirit. A valuable production of this tree is the *ejoo* already mentioned,[i] found between the trunk and branches, and used in the manufacture of cables and standing rigging. It affords also a farina of the nature of sago, and obtained from it in a similar manner. This tree grows in no other part of the world except this archipelago; and differs from the cocoa in being principally an inhabitant of the mountains.

The banana (*Musa paradisiaca*) is to the natives the most important of the fruits of the Indian islands, though never depended on as their chief subsistence in the same manner as it is in the tropical parts of America. Sixteen species or varieties of this fruit are cultivated in these islands; whereas in America there are only three. This archipelago furnishes the most curious, the richest, and the most extensive variety of the acido-dulces fruits of any portion of the globe. The greater number are indigenous, and some of the finest so peculiar that all attempts to propagate them in other countries, even of parallel climates, have failed. Many of them grow wild, and none but a careless cultivation is bestowed on any. The principal fruit trees are planted in a straggling manner about the villages. The common peasantry cultivate only the most ordinary fruits. The great select the most delicate varieties; but the European colonists are the most successful in this culture, and it is at their settlements that the greatest abundance of fine fruits is to be seen. The *Garcinia mangostana*, or mangosteen, ranks first in order, being the most exquisite of all known fruits. It is mildly acid without being luscious. In appearance it resembles the pomegranate, though smaller and more perfectly globular. A thick hardish rind encloses three or four large seeds, surrounded by a soft semi-transparent pulp of a pure white colour, sometimes slightly tinged with crimson. This pulp is the esculent part, and may be eaten without injury in larger quantity than any other fruit. It is only in the western parts of the archipelago that the mangosteen is a native. It does not thrive in the Moluccas, and in some does not grow at all. Luzon, in the Philippines, is the highest latitude in which it is brought to grow.

The durion, formerly mentioned,[k] is preferred to the mangosteen by the natives; but its peculiar odour is

[a] 27° Reaumur.
[b] 10° to 12° Reaumur.
[c] Labillardière, Voyage a la recherche de M. de La Perouse, t. II. p. 309. Compare Radermacher, Description de Batavia, p. 45.
[d] Cook's First Voyage, book III. chap. XI. Wurmb and Wollzogen's Letters, in German, p. 372, and 380.
[e] Valentyn, p. 131, and 238. Bogaerts, Historische Reizen, liv. I. p. 170. (in Dutch.)
[f] "12 Fr. leagues."
[g] Wollzogen, p. 378.
[h] Crawford's Hist. of the Archipelago, vol. I. p. 367
[i] P. 569.
[k] P. 567

offensive to strangers. The tree is lofty; the fruit resembles the bread-fruit, though larger. In structure and disposition the fruit resembles the mangosteen. The seeds which the pulp incloses are as large as pigeons' eggs, and when roasted, have the taste and flavour of chesnuts. One durion costs more than a dozen pine-apples. It is never found wild, like the mangosteen. In geographical locality it is equally limited. The attempts made to transplant these fruits to the isle of France, and other equatorial regions, have always failed.—The common jack, the produce of the *Artocarpus integrifolia*, a fruit of enormous size, and growing in great abundance, is much eaten by the natives, and is exceedingly sweet and nutritious. The champadak, another and more delicious species of the jack, is also cultivated. The mango attains as great perfection here as in Malabar. The orange and lemon tribe are widely diffused over this and all the islands of the archipelago. The shaddock is found in the greatest perfection. The lime is abundant, and productive through the whole year. Pine apples are good and exceedingly plenty, but are very little in request. The jamboo, the guava, the papaya, the custard apple, or *annona*, the cashew, (*Anacardium occidentale*,) the pomegranate, the tamarind, and the pumpkin, and other cucurbitaceæ, are only a few of the numerous fruits of this island. The flower-bearing trees most frequently cultivated for the market, are the *champaka*, (a species of *michelia*,) the malor, (*nyctanthes*,) and the tanjung, or *Mimusops elengi*. Water-lilies are particularly frequent in Java. The *Plumeria obtusa*, or camboja, is a strong but agreeable aromatic, and the *Ocymum sulasi*, or Hindoo tulsi, another aromatic flower, is cultivated for the express purpose of strewing on graves at the annual festival observed in honour of ancestors. Roses and other European flowers dwindle in size and lose their perfume when transplated to this part of the world.—Cotton is the most important article of commerce produced in these islands, but that of Java is the coarsest and least valuable. Materials for cordage are obtained from the *rami*, a species of nettle five or six feet high, and from a tree called the *bagu*. Among the useful plants are the rattan, (*Calamus rotang*,) the bamboo, and the *nipa* or cabbage palm, the leaves of which are better adapted for thatch than any others. There are many valuable timber trees, such as the teak, which has been found so durable a material for ship-building, though containing an odorous resin which unfits it for making casks and other vessels intended to contain wine; but it makes excellent water-casks. The teak of Java is superior to that of the Birman empire, but not so good as that of Malabar. Those parts of the world which lie between China and Persia are the only regions in which this tree grows. Timaca, ebony, and many others fitted for ornamented cabinet-work, are also found here. Among the gums, that which is called *damar* is the most important. It is produced in very large quantity, and without any trouble, from several trees. Its greatest consumption takes place in the paying of the bottoms of ships and boats.

Three species of indigo are cultivated in this island, but the preparation of it for use is conducted in a very rude and slovenly manner. Kasumba, American arnotto, turmeric, sappan or Brazil wood, mankudee, and ubar, which last resembles the logwood of Honduras, are the principal other dye-stuffs produced in this island. Some substances, exerting powerful effects on the human frame, which may be turned to advantage at some future period, in this country, are the datura, the cubeb pepper, and the *upas*, of which there are two sorts, the one called *anchan*, and the other *chetik*. The qualities of the upas have given rise to some ridiculous exaggerations; the chetik species, the most powerful of the two, kills a dog in six or seven minutes, but it does not kill men or animals at a distance, nor does it blast the growth of every surrounding plant.[a]

For foreign exportation Java produces the sugar cane, of which there are several varieties, three of which are believed to be indigenous. They grow with very little culture. Pepper grows both cultivated and wild. Coffee and cocoa are also in some measure cultivated, the latter only in small quantities in this island.

Buffalos, of a small brownish[b] breed, are here tamed, and yoked in large wagons. Sheep are few in number, with pendant ears and coarse hairy wool.[c] The horses are small, but strong and lively. Wild boars breed in great numbers in the forests. We are told by travellers that the rhinoceros is found in the island. Among the monkeys of Java are the *Simia apedio* and the *Simia aygula*. In the woods are found the flying squirrel, and another species, the *bicolor*. The peacock is common in the forests. There are also wild cocks, with brilliant plumage and white crests, slightly tinged with violet. The marshes are inhabited by that formidable serpent, the *Boa constrictor*, which swallows birds and even goats[d] entire. There are also crocodiles of enormous size. Flying dragons flutter in the neighbourhood of the towns during the heat of the day, like the bats of Europe, and are easily caught. The *Cicada tibicen*, or musical grasshopper,[e] perches on the trees, where he utters a piercing noise like the sound of a trumpet. Cockroaches and small red ants find their way into every crevice, destroying every thing that comes in their way.

Java produces, in great abundance, the *hirundo esculenta*, that species of swallow the nests of which are used as an article of luxurious food among the Chinese. This nest has the shape of a common swallow's nest, and has the appearance of fibrous ill-concocted isinglass. Even the common house martin, and all the other swallows in that country, mix more or less of this substance in the structure of their nests. The *hirundo esculenta* always builds in the caves of the rocks, at a distance from any human dwelling. Some are fifty miles from the sea. Along the sea-shore they are particularly abundant, the caverns being there most frequent. The manner in which this substance is procured, and the question, whether it is entirely a secretion, elaborated in

[a] The cultivation of the cinnamon has been recently attempted in Java. 3,000 plants were imported from Ceylon to Batavia in 1826.—P.

[b] "Grisâtre," greyish.

[c] "Des poils au lieu de laine," hair instead of wool.

[d] "Des volailles et même des chevreaux," fowls and even kids.

[e] "Cicade," cigale, not a grasshopper strictly, but one of the same genus with the American locust.—P.

some part of the body, are points not yet ascertained by actual examination. The finest are those obtained before the nest has been contaminated by the young birds; these are pure white; the inferior ones are dark, sometimes streaked with blood, or mixed with feathers. Some of the caverns are very difficult of access, and dangerous to climb, so that none can collect the nests but persons accustomed to the trade from their youth.

The island of Java is divided by the Dutch into four unequal parts; the kingdoms of Bantam, Jocatra,[a] and Cheribon; and the eastern shore, extending from the river Lossary to the straits of Bali. This eastern shore is subdivided into three parts; the territories of the emperor, or Susuhunam,[b] those of the Sultan, and the provinces under the immediate jurisdiction of the Company.

The city of Bantam, the capital of the kingdom of that name, has a harbour which has been rendered inaccessible by its extreme unhealthiness, and the gradual accumulation of the coral reefs. The king furnished to the Company 3,000,000 lbs. of pepper annually, at twenty-eight livres per quintal. The fort of the residency was garrisoned by a small body of Europeans. This depopulated kingdom contains no other place of note; and, according to the latest census, is peopled by 90,000 inhabitants, who live mostly in the villages scattered along the sea-coast.[c]

The old kingdom of Jocatra contains the famous capital of the Dutch Indies, the city of Batavia, in the site of the ancient Javanese city of Sunda-Calappa.[d] The Dutch seem to have given the preference to this situation for the convenience of the inland navigation. It is, in this respect, a second Holland. Almost every street has a broad canal, the stagnant waters of which are more remarkable for poisoning than for embellishing the city. The public buildings are mostly old, heavy, and in bad taste. The city is inclosed by a stone rampart of moderate height, but old, and falling to decay. The citadel contains apartments which serve as a retreat to the governor-general and council of India during a siege. It contains, also, the great magazines of the Company. Batavia cannot be besieged by sea; the water being so shallow that a gun-boat[e] can scarcely come within cannon shot of the ramparts, except in a narrow channel called "the river," defended on both sides by moles extending for half a mile into the harbour, and terminating under the fire of the strongest part of the fort. The harbour of Batavia is reckoned the finest in India; and is of size sufficient to contain the largest fleets. The population, including the suburbs and the *campongs*, or Chinese, Macassar, and other dependent villages, was found, by an accurate census taken in 1799, to amount to 173,117 souls; of whom 20,000 were Chinese, and 17,000 negro slaves.[f g]

The environs contain beautiful walks, resembling the boulevards of Paris,[h] with rows of country seats, in which the Europeans seek protection from the insalubrity of the climate. At Weltefrede, and at Mester-Cornelis, there are elegant barracks for the troops. The inland provinces, such as Priangan, Sookapoma, and Samadang, are governed by vassal princes, almost reduced to the condition of mere civil magistrates. The whole population of Jocatra, at the time of the census just alluded to, was 340,915 souls.

The small, but fertile kingdom of Cheribon, furnished the Company with 330,000 lbs. of rice, 1,000,000 of sugar, and 1,200,000 of coffee. Cheribon, the capital, is a large city. Its sovereign reigns over 90,000 subjects, and takes the empty title of Sultan. About four miles[i] from the city is the tomb of Ibn Sheik Mollana, the first apostle of Islam who visited this island, and consequently held in great veneration, and much visited by the Mussulmans. Five terraces are constructed along the slope of a mountain, the parapets of which are adorned with beautiful flower-pots, presented by the Mussulman kings of the adjoining islands; the tomb itself is shaded with palms.[k]

In that part of the eastern shore, which is subject to the Company, we observe the following towns in an order from west to east. Tagal, containing 8,000 inhabitants; Samarang, the second city of the island, the capital of the Dutch government,[l] containing a population of 30,000; Japara, formerly the capital of this coast; Javana; Rembang, the great mart for *jati* wood;[m] Surabaya, a fortified town, very healthy, and provided with a road-stead, where vessels may go in and out in all weathers; the fortresses of Pamanoncan and Baniuwangni,[n] in the deserted province of Balambonung, the capital of which was destroyed by the ravages of war. The population along this coast in general has diminished during the 18th century, and the Company's subjects in 1774 did not exceed 414,000. It is not unlikely, however, that a long period of peace subsequent to that date has ameliorated the general state of the country.

The inland and southern parts of the eastern division of the island, formed the political state,[o] the sovereign of which bore the titles of Susuhunam, and emperor of Java. By giving encouragement to civil dissensions, the Company has contrived to divide the empire, previously much reduced, between two princes, one of whom resides at Sura-Carta, and reigns over 512,000 subjects, with the title of Emperor; the other lives at Jogo-Carta,[p] has 522,000 subjects,[q] and the title of Sultan.[r] A German military man, who visited the court of Susuhunam, describes it in the most flattering colours.[s] The air is pure, cool, and perfumed with the odour of delicious flowers. In one part the traveller wanders among vast plains covered with rice, cotton, coffee, and vegetables of every kind. In another, as-

[a] "Jacatra."
[b] "Sousou-Honam."
[c] Memoirs of Batavia, vol. I. p. 6. III. 424.
[d] Description of Batavia, contained in the Memoirs of the Society of Batavia, I. p. 42.
[e] "Chaloupe."
[f] "Esclaves noirs," black slaves.
[g] Batavian Memoirs, III. p. 425; compared with II. p. 61.
[h] MS. of M. Deschamps.
[i] "1 1-2 Fr. leagues."
[k] Valentyn, p. 37.
[l] "Chef lieu de la Côte Orientale," capital of the Eastern shore, or the Dutch government in that part of the island.—P.
[m] Valentyn, Description of Java, p. 15.
[n] MS. by M. Deschamps.
[o] "Formed originally the kingdom of Mataram."—M. B.
[p] "Djogo-carta," Jocjo-carta.
[q] "Has received from the Dutch a population of 522,000," &c.
[r] Batavian Memoirs, III. p. 427.
[s] Wollzogen, Letters, p. 378.

cending the hills, he sees the limpid rivulets forming little cascades under the shadow of close and deep forests. It abounds with natural grottos of delightful coolness. In the distance, the eye ranges over seas, rocky hills, and volcanoes, varying by their perpetual smoke the azure of a serene sky.

The population of the island of Java, amounting to more than two millions, consists of natives or Bhoomi,[a] and strangers. Of the latter, the Dutch, Chinese, Macassars, and Balians, are the most conspicuous. There is a native tribe of negroes, who wander among the mountains, and another tribe, called Isalam, who live on the sea-shore ; but their physical character and their language are not known with any certainty. The native Javanese seem to be a Malayan race, who long ago settled in this island, and were subsequently civilized by a colony of Telinga Hindoos,[b] from whom they derived several terms of their language, and many institutions.

The Javanese, in general, are of middling stature, with tawny complexions, long hair, and the nose a little flattened. As for diseases, they are exempt from the gout, and are less liable to nervous disorders, such as apoplexy, and epilepsy, than the people of Europe. They are liable to several cutaneous diseases, some of which are unknown in Europe. Some loathsome contagious diseases, such as yaws and sibbens, are frequent among them, and supposed to have been brought by the Chinese. Children are liable to worms, and other fatal complaints of the intestines, in consequence of their unlimited indulgence in raw vegetables and fruit. The men are strong, athletic, and persevering, though not active in their personal exertions. The porters will carry a heavy load, walking thirty miles a day, for several days in succession ; but they neither run nor leap, and never attempt feats of activity. The arts of the juggler and tumbler are quite unknown among them. They bathe frequently, yet are defective in personal cleanliness. They live frugally on rice and fish, with a few spices. Intoxicating liquors are seldom indulged in, and only at the public feasts, when the chiefs sometimes make themselves sufficiently merry, and caper about with no small extravagance. They have been described as devoid of industry, being satisfied with a life of comparative poverty and privation ; but, whenever they are placed in a situation in which the fruits of their industry are secured to them, they are found very well disposed to improve their condition by virtuous exertions. They have an abundant portion of fortitude, which is displayed rather in suffering with patience than in braving dangers ; but, when their vengeance is roused, they perform acts of desperate valour, bordering on insanity. In understanding they are slow ; of narrow, though sound judgment ; and much inferior in subtlety to the Hindoos and Chinese. They are tolerably good imitators, though not equal to the Hindoos. They have a remarkable delicate musical ear, and readily learn to play the most difficult and complex airs on any instrument. They have an abundant share of laudable curiosity. Mr. Crawford mentions an instance of a sagacious chief of Samarang, who lately had his wife and children well educated, the latter being sent for this purpose to Calcutta, and who afforded a promising instance of the capability of these islanders to profit by a liberal education. The Javanese are honourably distinguished from the civilized nations of Asia by their regard for truth. To persons accustomed to the people of Indostan, the candour of the Javanese appears singularly valuable. The truth is readily elicited in a court of justice, and it is not uncommon for the criminal to make an ample confession of his guilt. Having no capacity for intrigue, they are much imposed on by strangers. They are neither litigious nor avaricious, but tenacious of their rights, and disposed to demand justice with great boldness, considering the tyrannical character of their governments. They are not unkind or oppressive to inferiors, and are much more ready to relieve distress than the continental Indians. They are not irascible, or addicted to abusive language, and have the character of great and willing hospitality. They are remarkably credulous and superstitious, believing in dreams, omens, fortunate days, the casting of nativities, supernatural endowments, sorceries, and enchantments. Their forests, mountains, and caves, are peopled by numerous invisible beings of their own creation, or adopted from the various sorts of people who have come among them. Their ancient code denounced the most barbarous punishments for practices which were imputed to sorcery, such as writing the name of another person on a shroud, on a bier, on an image of paste, or on a leaf, which is then buried or suspended from a tree, or placed on haunted ground, or where two roads meet. For these, and numerous other silly acts which the law enumerates, the punishment is death, not only to the individual, but to his parents and his children. That code is now not in force except in the neighbouring island of Bali. But Mr. Crawford mentions two recent instances of very whimsical superstition in Java. It was discovered by accident, that, from some motive of this kind, the skull of a buffalo was conducted from one end of the island to another ; the point insisted on being, never to let it rest, but keep it in constant progressive motion. It was believed that some dreadful imprecation was denounced against the man who should let it fall. After travelling many hundred miles, it reached Samarang, where the Dutch governor caused it to be thrown into the sea. No resentment was expressed, and the matter dropped ; but it was never discovered how or where it had originated.[c] In 1814, a smooth road, fifty or sixty miles long, and twenty feet broad, leading to the top of an inland mountain called Sumbong, was suddenly formed, crossing no rivers, but passing in an undeviating line through private property of all descriptions. The population of whole districts was employed in the labour, and all because an old woman pretended to have dreamed that a divine personage was to descend on the mountain.

Political impostors, preaching a new religion, very often take advantage of this national facility of the Javanese, and give rise to bloody insurrections. These

[a] Deschamps, in the "Annales des Voyages," t. I. p. 145, &c.
[b] "By a colony of Hindoos, especially of Calingas."
[c] Crawford's History, vol. I. p. 57.

pretenders are called *kraman*. One who was apprehended in 1812 had disturbed the district in which he appeared for six years. The Javanese are much addicted to revenge, never forgiving an injury, and long cherishing the deepest resentments. Their revenge and impatience occasionally burst out in those insane and horrible excesses called mucks, which are most common in Celebes, but occur also in Java and most of the other islands. The state of society in Java, as in the other islands, produces among the inhabitants a disregard for human life. The lives of the people are not at all valued by the chiefs, or by one another. Familiar with death, they view it with no horror. An assassin may be hired for twenty shillings, provided the person to be assassinated be a plebeian. Such a practice is indeed not common, as a man generally takes vengeance with his own hand.

The Javanese, and other islanders in this part of the world, have been accused of treachery, but the authority on which this accusation is advanced is more than questionable. They show much integrity in their transactions with one another. It is only in their intercourse with strangers that gross deceit is practised, in lawless acts of piracy. As for the resistance which they have made to the restraints imposed on them by their European masters, and their secret attempts to evade the operation of them, they had certainly more to complain of than the party to whom their conduct was obnoxious. Their women are not at all secluded, and, though wives are purchased, they are not treated with contempt or disdain. Among the lower ranks, the women are very active and industrious. Those of the better classes are withdrawn from the public gaze, but not immured. The wife and daughters of the chief of Samarang attended the public parties given by the Dutch and British, and conducted themselves with the most creditable propriety and delicacy. Polygamy is practised, but the first wife is the only one who possesses the same rank with the husband, and is mistress of the family. In Java, there is a greater laxity of morals than in the other islands. Women very frequently divorce their husbands. Complimentary inquiries after men's wives are not, as in India, thought improper, but rather courteous. Parental attachment and filial respect are well maintained to the latest period of life. Fraternal affection between children of the same mother is warm and active. They are all much attached to their tribe, and to the place of their birth.

In their marriages the Javanese differ from the Hindoos. The women marry at fifteen, and the men about eighteen or nineteen. Widows and widowers marry again at any age; and discordant matches, from disparity of ages, are comparatively rare. The present sultan of Java is married to his cousin, who is three years older than himself. Differences are observed in the mode and terms of the married state, according to the relative rank of the parties; as when the woman is of superior family to the man, or his equal, or his inferior. The last sort of connexion is commenced without any form or ceremony. They give their children their names when the umbilical cord drops off. Some give an Arabic name. This is common among the Malays, and is intended as an expression of piety. Others give the child such an appellation as "the handsome one," or "the weak one;" and the parents will be called the father and mother of the handsome or the weak one. Thus the names are frequently mere titles, and are changed at every promotion of a man's state or circumstances. This would render it difficult to identify individuals if they were liable to a frequent change of habitation. They bury their dead in the manner of the Mahometans, and attend much to beauty and simplicity in the appearance of their burying grounds. In showing respect for superiors they sit with the head covered. In approaching a superior, and retiring, they stoop as low as is consistent with locomotion. A superior testifies his most marked regard for an inferior by offering him the chewed refuse of the betel, which the latter swallows with great satisfaction. They never salute by kissing, but by applying the nose to the head or neck of the person saluted; hence the term for smelling signifies to salute. The chewing of betel, tobacco, and opium, are almost universal practices. They are passionately fond of gaming, particularly of staking on the issue of combats between pugnacious animals, such as cocks, quails, and even crickets, which they excite to combat by tickling them with a blade of grass. They will even childishly risk their money on the strength and hardness of a nut. They are also fond of the spectacle of fights between the large ferocious animals, such as the tiger and the buffalo. The tiger being shy and unwilling to fight, is shut up with his antagonist in a close cage. The buffalo exerts himself to crush him to death on the bars of his cage, in which attempt he generally succeeds. The efforts of the tiger are directed to the head and throat in a sudden and insidious manner. The first onset is tremendous, but if one or the other is not immediately victorious, there is no interest in the combat; both animals worn out are reluctant to renew their efforts. Under these circumstances the natives use abominable means for rousing them; such as fire-brands, boiling water, poisonous nettles, and infusions of capsicum poured on the lacerated skin. They scarcely ever amuse themselves with those exercises which display address or agility. The country is unfavourable to the chase; and it is but seldom that they hunt. Some of the more abject savage tribes indeed hunt the deer, the hog, and the monkey, as their chief means of subsistence. In some of the ill-peopled districts in the eastern and western extremities of the island, they follow the chase for amusement, but it is a mere butchery of game, without sport or address. The tiger is sometimes pursued with more skill. An extensive circle of spearmen is formed round his known haunt; this is gradually contracted, till the animal hemmed in on all sides, is compelled to attempt an escape by rushing through the phalanx, in which attempt he is commonly killed by the numbers and dexterity of the hunters. A similar scene is sometimes acted before the Javanese princes at their palaces. Dancing is considered as a necessary accomplishment to every Javanese chief; and they practise it at their public festivities, brandishing at the same time, their kreeses, and mingling with the hired dancing women. In this amusement respectable women never join. The intellectual amusements of the Javanese consist in listening to professed story-tellers, and a rude species of

drama, sometimes executed by living actors, sometimes by means of puppets. In the first case the whole is performed by men. In the second they sometimes use ordinary puppets, much inferior to those of Europe; and sometimes certain scenic shadows, which are peculiar and national. Their acting is a sort of pantomime, accompanied by a recitative performance, read by a conspicuous individual called the *dalang*, who sits full in view of the audience, and, before the interlocutors commence acting each scene, repeats the narrative of what they have to perform. The whole is accompanied by a Javanese band of music. The subjects are taken from the Hindoo legends and the fabulous parts of their own history. They have also exhibitions of men personating the appearance and manners of wild beasts, which are very well managed. All these amusements excite a lively interest in a native audience.

Their houses consist of apartments, each of which stands on four pillars. Those of the rich consist of a collection of them; those of the poorer classes of one only. The houses are never solitary, but always grouped into villages or towns. Some remains of brick and lime walls show that architecture has declined among them in modern times. There are arches still standing, but they have now lost the art of building them. The art of weaving is rudely conducted, and entirely in the hands of women. A cubit of coarse cloth, five spans wide, is a common day's work. They are ignorant of calico printing; and as a substitute for it they daub their cloth with wax in particular figures, and then put it through the dying vat, thus obtaining a coloured ground while the figures are left white. The silkworm has never been bred in this island, though its climate is undoubtedly favourable for it. With regard to the metals, their chief skill is exerted on gold. Iron is not found in Java, and is extremely rare in the whole archipelago. It bears a high price, and the art of the blacksmith is held in a sort of reverence. The term for that craft is equivalent to the word "learned." His principal skill is displayed in the manufacture of the dagger or kreese, and the spear. They do not possess the art of tempering their blades. The kreese is a piece of ordinary iron, which seldom recovers its shape when bent. Ship-building is the only department of carpentry in which they have made any proficiency. There is no art which they have carried to so great perfection as that of fishing, which is chiefly conducted by drag-nets, and traps or snares skilfully formed of pallisades. A large supply is obtained from the salt marshes of the coast, which are embanked for the purpose of rearing and feeding sea-fish. This practice was probably introduced from China or some part of Chin-India. The fish are, for the sake of economy, almost always eaten salted and dried. They universally use a sauce formed by the putrefaction of small fish, chiefly prawns; and no food is deemed palatable without it. They manufacture great abundance of salt by slow solar evaporation, and obtain it mixed with some soil and dust, but free from those saline admixtures belonging to sea-water, which injure the culinary article by the bitterness and deliquescent quality which they impart to it. They manufacture gunpowder from the nitre found in the caves frequented by bats and swallows, and from sulphur found near the volcanoes; but it is always an inferior article, and the gunpowder imported from Europe is much in request. They are unacquainted with the art of cutting and polishing precious stones. Their diamonds are cut by Hindoos; their rubies and sapphires are worn in the rough state. The manufacture of glass seems never to have been known among them. In the mechanical arts, however, they have none of that bigotry in favour of their own methods and tools which characterizes the Hindoos, and show an open docility which would soon profit by instruction.

Cotton is the grand material of their dress, which is a medium between the close habit of the Europeans, and the loose flowing robe of the continental Asiatics. The ancient practice seems to have been to go with the head uncovered, which is still followed in the neighbouring island of Bali. At present the Javanese generally wear a cap in imitation of the Mahometan turban. The legs are always bare; the feet are often covered with sandals, in imitation of the Arabs. They adorn their persons with diamonds, gold ornaments, and flowers. Men of all ranks invariably wear the kreese. They constantly file and blacken the teeth. It is on the canine teeth that the first operation is performed. They express their contempt for persons who do not follow this practice, by saying that white teeth make men like dogs and monkeys.

The Javanese, like the rest of the inhabitants of these islands, are altogether unacquainted with arithmetical processes. The Chinese are much employed by them in their mercantile transactions. Though they know the Hindoo numeral characters, they frequently calculate by cutting notches on slips of wood. The women are more expert than the men in all pecuniary transactions, and are commonly employed as brokers. The methods used by the people of this island have rather greater facilities than those of their neighbours, their numerical scale extending to ten billions.[a] Some of the Indian languages have no term for any number higher than a thousand. Mr. Crawford, who resided some time in Java in different official situations, considers the Javanese as having made very great proficiency in music for so rude a state of society. They have wind instruments, stringed instruments, and instruments of percussion. The two first are rude. The mountaineers have a sort of Pan's reed, made of bamboo, which is not used for any melody, but merely made to give a confused sound by means of a rapid motion, given to the whole contained in a frame. They have fifes from Indostan and trumpets from Persia. The drum is a native instrument. Their gong is perhaps of Chinese origin. They have a great variety of *staccados*, some made of graduated pieces of wood, which give a sweet sound when struck with a hammer, others of metal, which have a stronger sound. These have various arrangements and contrivances for improving the sound.

The Javanese language is praised by Mr. Crawford for the beauty and regularity of its written alphabet, having a separate mark for each sound, and no mark expressing more than one. They have an ancient language called Kawi, which is peculiar to the priesthood, and in which the mythological writings, called the Ma-

[a] There seems to be a contradiction in the above statements respecting the modes of calculation in Java.—P.

harabat and the Ramayana, are composed in verse. It contains many Sanscrit terms, but seems to be radically native and original. The language in common use is sufficiently well adapted to the ordinary purposes of life, but not to any thing like abstract reasoning or science, in which the Javanese have never had any practice. Their compositions are wretchedly feeble and empty, containing nothing to reward research. Their chief productions are the dramas already mentioned. In their letters and conversations they have, in a great measure, a separate vocabulary in addressing a superior. In this language of deference, which is associated with feelings of delicacy and refinement, both the names of provinces and cities, and the terms for common ideas, are changed for others. Notwithstanding the long period in which the Mahometan religion has been established, and Arabian literature made known, (between 300 and 400 years,) the Arabic language and literature have made very little progress among them. A little Arabic is taught in the schools, but few even of the upper ranks make any proficiency in it. All the Arabic writings circulated in Java relate to religion and law. In writing their own language they are extremely inexpert in the mechanical as well as in the mental part. Before the introduction of the Mahometan religion they knew nothing of the writing of history, and were as ignorant of chronology as the Hindoos.—The histories of transactions are now written under the direction of their princes, who employ the most expert individuals in versification and penmanship that they can find. The great object is to turn every event into a long solemn tale, in a string of verses.

One of them gives an account of the following event. Surapati, a native of Bali, the slave of a Dutch citizen of Batavia, raised himself to sovereign authority in opposition to the native and European governments, and maintained it till his death. The Dutch, having defeated his descendants, and despoiled their territory, took up the dead body of the extraordinary founder, and treated it with indignity. This vile transaction is thus described by the Javanese. "The commissary remained long at Pasuruhan, making diligent search for the body of Surapati, but it was not to be found. He was distressed at this, and said to the inhabitants, 'I will reward whoever finds for me the body of Surapati.' Those people forgot their lord, and accepted the proffered bribe. The commissary was shown the spot where was the chief's grave, but it was level, and no one could discern it to be a tomb. The body was dug for and found. It was still entire as when alive, and shed a perfume like a flower-garden. The Hollanders bore it away to the camp, and placing it in a sitting posture in a chair, the officers took the corpse by the hand, saluting it according to the custom of their country, and tauntingly exclaiming, 'This is the hero Surapati, the mighty warrior, the enemy of the Dutch.' After this, they threw the corpse into a great fire, and burnt it to ashes, and the ashes they took and preserved. The commissary all this time rejoiced in his heart."

Besides the Javanese language, there is one spoken by the mountaineers in the west part of the island, and over one third of the area of the whole, though only by a tenth part of its inhabitants. The same language is spoken on the opposite coast of Sumatra, and is called the Sunda. It is more guttural, and in other particulars has less euphony than the Javanese. The letters *d* and *t* are wanting in it. It has some tendency to a separate style for deference, which is not carried so far as in the Javanese. Although this language has an alphabet and written character, there are no books in it, as the people have no national literature. The vestiges of their writing are only found on ancient rude stones. Those who aspire at a little education, learn Arabic and Javanese, and business is generally conducted in the latter.

The ancient religion of Java was a sort of Brahminism, though not in that strict and dogmatical form in which it exists in Indostan, and partaking of the doctrines and spirit of the religion of Buddha. Some of the mountaineers still abstain from animal food,[a] and believe in the transmigration of souls.[b] They trace their origin to a monkey, which they call *woo-woo*. The nature of the ancient system is chiefly to be inferred from the antiquities still to be found in this island. There are many architectural remains in its best parts. In some places there are large groups of small temples of hewn stone, with a statue in each; in others, large single temples of the same materials, without any cavity; in others, single temples of brick and mortar; besides which, there are stone temples of ruder construction, and more recent. The most perfect remains are the ruins of Brambanan, in the districts of Pajang and Mataram. One group goes under the name of "the thousand temples." There is a temple in the middle, sixty feet high, surrounded by four rows of small temples, all pyramidal, of the same character, and containing a profusion of sculpture on large blocks of hewn stone.[c] The temple of Boro-Budur, in the mountainous and romantic land of Kadu, is a square building, embracing the summit of a small hill, and ending in a dome. The whole building is 116 feet high, consisting of nine terraces, the lowest six being faced with square ascending walls, and the three uppermost containing each a circular row of latticed cages of hewn stone, in the form of bee-hives. At the base, each side measures 526 English feet. There is no concavity except in the dome. From the engraving given of it by Mr. Crawford,[d] it seems to present an elegant and imposing appearance. The oldest structures are remarkable for the excellence of their materials, their great solidity, and the minute laboriousness of the execution. There is an evident design in every group, and in every individual temple in Brambanan. They contain numerous friezes, cornices, architraves, and flat pilastres carved on the stone, but no balustrades, or colonnades, a defect which gives them a heavy look. None of the representations are gross or indecent. There are many vegetable decorations, but fewer figures of animals; the most usual are the lion, the elephant, and the deer; the cow is never seen. There are many historic groups, and seve

[a] In the original the assertion is general, "les habitans des montagnes."—P.
[b] De Wurmb, p. 134
[c] Crawford's History, vol. II. p. 197.
[d] Frontispiece to his second volume.

ral containing figures of Buddha; but in the latter, that personage is never represented as an object of worship in a temple, none of the figures round him being in a posture of adoration, and no attribute of a Hindoo divinity being attached to him. The rudest and most recent class of temples are mere heavy masses, without plan or design, the interior abounding in sculptures, generally rude, often half-finished, and sometimes extremely indelicate. They are peculiar in containing representations of native manners and costume, (frequently, for example, introducing the kreese,) and in the circumstance of having inscriptions. Java contains a variety of genuine Hindoo images, both in brass and stone. Those of Siva are the most frequent. Durga; Ganesa; Surya, the deity of the sun; the Bull of Mahadeva; the Lingam, and the Yoni, are the most common, except those of Buddha. The latter are never in the great central temples, but only in the smaller surrounding ones. Several of them are together, and when an object of worship exists in the same place they look towards it, thus appearing not to represent deities, but sages worshipping Siva. Mr. Crawford concludes from the various relicts of Javanese antiquities, that the Hindooism of that island was the worship of Siva, Durga, and the Lingam, and Yoni, united to Buddhism, and that it was a reformation of the bloody and indecent worship of Siva, brought about by persons of more kindly affections than the rest of their countrymen. The word Buddha is not associated with any precise form of faith or worship in the minds of the Javanese of the present day, but merely used as a name for idolatry or paganism, as distinguished from the religion of Mahomet.

The Mahometan religion was introduced from Arabia, and has been kept alive by the intercourse which has subsisted with that country. Its most distinguished triumph took place in 1478, in the capture of the city of Mojopahit, and the destruction of that Hindoo monarchy, by Raden Patah, who erected a Mahometan empire in Java, assuming the title of Susuhunam, or apostle,[a] equivalent to that of caliph. The Javanese are the most lax of all the Mahometans of these islands, both in principles and practice, in consequence of the Arabs having been excluded by the commercial jealousy of the Dutch. Wine is drunk openly, even at their religious festivals. The Mahometan institutions are mixed with marks of the Hindoo system. The priests are the successors in duty to the priest and astrologer of the Hindoo village, a peaceable and respectable portion of the peasantry, living on terms of perfect equality with the ordinary cultivators. Many of the inhabitants do not know the name of their prophet. The higher classes pay more attention to the forms of their religion, but in the use of wine and opium, and in the laws against games of chance and usury, scarcely any among them entertain the smallest scruple; the only negative precept which they rigidly obey is that of abstinence from pork. It is remarkable that some of the royal families abstain from touching beef, thus evincing a traditional remnant of Hindoo feeling.

The native government in Java is a hereditary despotism, exactly such as is established in all the great empires of Asia. A Javanese monarch, being also chief priest of his religion, is under no control from religion or the priesthood. He has no hereditary nobility under him to share or limit his authority. He is addressed in the most bombastic style of flattering and abject etiquette. His ministers and vicegerents are, in their different departments or provinces, invested with nearly all the authority of the sovereign. They are now, however, overawed by their Dutch masters, though they continue to display all the pomp of eastern despotism. The court of the Susuhunam preserves more of the former national customs than most others. All the great servants of the crown are designated by the most high sounding titles. His civil and military officers are the "Suns of Prudence," and the "Suns of Heroism."[b] His residence, subjected to the power of a small Dutch fort, is known by the name of Surakarta, which means "The habitation of the Sun." The palace is inhabited and guarded by 10,000 females, of whom 3,000 belong to the royal harem. The inner inclosure of the palace is called the *thalm*. A circular court, two miles[c] in circumference, is adorned with statues of Javanese heroes. Here the fêtes and tiger fights are exhibited. Two tamarind trees present an inviolable asylum to every person who has a request to present to the emperor.[d] Yet the whole force which this prince can command scarcely amounts to 20,000 or 30,000 men, and these badly armed. The people are treated by their sovereign and chiefs with the most contemptuous indifference, and their lives sacrificed to sport and caprice. Instead of mock fights for the amusement of the great, real battles are exhibited, in which the wretched combatants are, without the slightest quarrel, instigated to destroy one another. Yet Java is the only country of this archipelago where slavery does not exist among the natives. The revenue generally consists of one half of the produce of wet, and one third of that of dry lands. There seems to be no right of property in the soil among the subjects, and there are no large accumulated estates. Yet the condition of the cultivator is more fortunate than in any country of the east, in consequence of the great demand for cultivators and for labour in general. A sixth part of the produce is the pay of shearers. The servants of the king, from his ministers of state to his grooms, are paid by allotments of corn, or of land, or of a certain number of cultivators. This system supersedes the employment of numerous revenue agents, and a consequent system of chicanery, and probably contributes to give the Javanese a character of greater integrity than the Hindoos. Capitation taxes, fishery taxes, taxes on consumption, and transit duties, are also levied. The laws have the defects common to all eastern codes; but the administration of justice is rendered more pure than in India, by the greater honesty of the people, and the greater reliance due to the testimony of witnesses, who are not sworn except on occasions of peculiar solemnity; and their regard for an oath will restrain them in the most trying situations. An oath taken by the accused to his own innocence, is thought entitled to respect and credit.

The Portuguese visited Java in 1511, but did not at-

[a] "L'Auguste."—M. B. [b] Valentyn, p. 56. [c] "3-4 Fr. league." [d] Wollzogen, Letters sur Java, p. 385.

tempt any conquests. The Dutch arrived in 1595, which was 117 years after the establishment of the Mahometan religion. Their object was plunder, under the name and appearance of commerce. The simple natives were considered as fair game to their rapacity, and were ill fitted to withstand the intelligence, experience, and violence of these visitors. Till 1612 they traded chiefly with the kingdom of Bantam. Then they removed to Jacatra, where they traded peaceably for six years; but at last quarrelled with the prince who afforded them protection, subdued his country, sacked his capital, put its inhabitants to the sword, and built Batavia on its ruins, in 1619. A handful of Europeans at this time subdued the largest military combinations that were ever formed in Java. Ten years after this, when their fortress was not yet finished, they were attacked in two successive years, by the Sultan of Mataram, whose forces are said to have amounted in the first year to 100,000, and in the next to 120,000. The principal soldiery of the Dutch were Japanese; they also derived the most effectual assistance from the zeal and courage of the Chinese inhabitants. From 1629 to 1675, the Dutch transactions were chiefly mercantile, and here, as in their other settlements, this interval formed the most flourishing period of their colonial history. In this year, having assisted the Sultan of Mataram to subdue a rebellion among his subjects, they made a treaty with him, the object of which was, to restrict the commercial enterprise of his subjects, and thus confer on the Dutch the advantages of a monopoly. The effect, however, was, that these Javanese merchants being ruined, the Dutch had no natives to trade with, and suffered an immediate decline in those commercial profits which they were so desirous by this piece of injustice to extend. In a similar case they interfered in the politics of Bantam, followed the same policy, and with the same ruinous consequences. In 1686 began the public career of the illustrious Surapati, who, from the situation of a slave under a Dutchman of Batavia, raised himself to the head of a sovereignty in the east end of the island, which he and his successors held for twenty years. This state was subdued in 1707, and the importance of it virtually acknowledged by the indignities with which the disinterred remains of that hero were honoured. In 1722 a conspiracy, headed by Peter Erberfield, a Westphalian, for a massacre of all the Christians, was discovered, and the conspirators were put to death with every species of inhuman torture and savage insult.[a]

The bloodiest act of the Dutch in Java, or any where else, was the massacre of the Chinese in 1740. That people had been induced, by the security afforded under the European government, to settle in great numbers in this island. But the Dutch, jealous of their numbers, kept them down by excessive taxations, arbitrary punishments, and frightful executions. That people, goaded in this manner, turned their attention to the means of a combined resistance. A few of them having been shipped off to Ceylon for some pretended irregularities, the Chinese around the city flew to arms. Numbers of those within it were put to the torture; and a story of a "wicked and long meditated conspiracy" was thus put together. On a fire happening in the Chinese quarter of the city, the Dutch colonists took the alarm, this being construed into an artifice for commencing a massacre of the Europeans. They now rose on the Chinese. The massacre was formally authorized by the regency, the houses were burst open, and the inhabitants dragged out and murdered, without offering the smallest resistance. For fifteen days the appalling scene was continued, and not less than 10,000 were massacred in the town of Batavia alone. Those who escaped fled to the Susuhunam, and joined him in a series of desolating wars and rebellions, which lasted for fifteen years. From the termination of these contests to 1810, the Dutch continued in a state of peace. In that year they moved a force to Yugyacarta,[b] deposed the Sultan of Java, and placed his eldest son on the throne. In 1811 all the Dutch colonies having, along with the mother country, fallen under the dominion of France, the British took possession of Java. In 1813 many liberal and beneficial changes were effected. The island, however, was restored to the Dutch by the treaty of peace in 1816.[c]

The Dutch are freely permitted by their government to purchase and hold lands, and are fairly naturalized. The Creole and mixed races labour under the disadvantage of a want of liberal education; are habituated to tyrannize over the persons of the Javanese; and are entirely served by slaves. They are, with few exceptions, ignorant, timid, servile, and indolent. They indulge in convivial parties, but labour under a constant reserve, arising from the arbitrary and jealous nature of their government. The women, marrying early, and habituated to the society of their female slaves, have the character of gross ignorance and insipidity. They entertain a great jealousy of the attractions of the slaves by whom they are surrounded, and under that feeling inflict gross cruelties on them with their own hands.[d]

The Chinese settlers in Java have generally been numerous. The talents of this nation for business and commerce enable them to thrive in these regions; and they would be much more numerous were it not for the law of the Chinese empire, which strictly prohibits the emigration of women. They are enterprising, keen, and laborious, but luxurious, debauched, and pusillanimous. They are much employed in handicraft trades, in which they greatly excel. They are noted for a total want of faith, the least temptation of gain inducing them to evade the fulfilment of any engagement. All of them are from the province of Fokien or that of Canton; the former maintain the best character, being rarely from the very lowest ranks of society, and less gross and abject in their manners.

The small Island of Madura, near the eastern part of the northern shore of Java, is separated from it by a narrow strait not two miles in breadth. It is supposed to contain 60,000 inhabitants,[e] who are a poorer and ruder

[a] Crawford, vol. II. p. 422, &c.
[b] Jogo-carta, p. 575.
[c] In August 1825, an insurrection broke out in the eastern part of the island, which has continued with various success to the present time. By the latest accounts, there was a prospect of peace.—P.
[d] Stavorinus, quoted by Crawford, vol. I. p. 139—149.
[e] Batavian Memoirs, II. 427.

people than the Javanese. They have a peculiar and totally distinct language, but such of them as are at all educated understand Javanese. The island is subject to a prince who is called *Pahambana*, or "the Adorable." He has been deprived of two of his provinces, and now possesses the western portion of the island.[a b] Bull-fights are common in this island, a species of amusement not known in any other part of the archipelago.

The Island of Bali, which is separated from the east end of Java by a narrow strait, has been called by some Dutch authors "little Java." A chain of high mountains, clothed with impenetrable forests, crosses it from north-west to south-east, containing mines of gold, copper, and some[c] say iron; this last metal, however, is rarely found in these islands. The level part is extremely fertile in rice. Gilgil, the sultan's capital, stands on a river of the same name, which falls into the strait of Lombok, at the east end of the island. The inhabitants are fairer and better formed than the Javanese, and are noted for intelligence and courage. Slaves are often obtained from this island, and a particular value is set on them. The inhabitants have a peculiar language, which has been extended by conquest to the adjoining island of Lombok. Bali is the only country in the archipelago in which the Hindoo religion is maintained, with the exception of a few of the mountainous parts in the east end of Java. The Balinese belong, in general, to the sect of Siva, and there are among them a few Buddhists. They have divisions of caste similar to those of Indostan; and some outcasts, such as their potters, dyers, dealers in leather and in ardent spirits. The Brahmins are genuine Hindoos, but the people in general are left to their local superstitions. The Brahmins are treated with great respect, and the administration of justice is in their hands. They live entirely on vegetable food, but the people eat animal food without scruple. They perform no such extravagant acts of self-mortification as are so common in India; but the voluntary sacrifices of widows on the funeral piles of their husbands are carried to an excess unknown even in India. It chiefly takes place among the military and mercantile classes. At the funeral of a chief seventy or a hundred women have been known to immolate themselves.[d] The female slaves also devote their lives in a similar manner at the funeral of a royal mistress. They are generally poignarded before their bodies are committed to the flames. Bali was the resort of the Hindoo refugees from Java when persecuted by the Mahometans; about which time the Brahminical system was inculcated on them with increased strictness by fresh Indian missionaries. The inaccessibility of the shores of the island has contributed to preserve it from the encroachments of other religions.

The strait of Bali is the safest route for vessels bound to Europe during the western monsoon, when the passage by the strait of Sunda is rendered difficult. The current in the strait of Bali carries the vessels along even when the winds are contrary.

To the north of Java, and the south-west of the Philippine islands, is the great Island of Borneo, the largest in the world next to New Holland. It is probably about 750 miles long, and 620 broad.[e] Its central parts have never been explored by Europeans, and the insalubrity of the climate has prevented them from frequenting its shores. On this account the geography of Borneo is very imperfect. It is probable that the centre of the island, where the springs take their rise,[f] is a marshy table land, inundated during the rainy season. This seems to be the best explanation of an old tradition, of the existence of a lake in the centre from which all its rivers issue.[g]

The principal chain of mountains must lie north and south not far from the east coast. The Dutch call them "the Crystalline mountains,"[h] from the numerous crystals found in them. One of the most remarkable peaks is called by the natives Keenee-Bollo.[i] This island is often devastated by volcanoes and earthquakes.

The coasts, for a breadth of from fifteen to fifty miles,[k] present nothing but marshy soil, part of which is a moving bog or half inundated land.[l] It is only by means of the rivers that we can penetrate the country. They have many branches, which are connected together by natural canals. The river Pontiana or Sukadana,[m] in the west, and that of Banjermassin in the south, seem to be the largest. Though situated under the equator, this island is subjected to no insupportable heats. The sea and mountain breezes, and the rains, which are constant from November till May, impart a degree of coolness to the atmosphere. At Sukadana the thermometer varies very little, being scarcely ever under 82° of Fahrenheit, or above 94°.

Gold is found in Borneo in large quantity, and more is exported from it than from any of the adjoining islands. It is the only island of this archipelago which affords the diamond, a mineral not found indeed in any other country except Indostan and Brazil. The diamond mines are confined to the west and south coasts, being principally situated in the territories of the princes of Pontiana and Banjermassin. The best are at a place called Landak. A perpendicular shaft is first dug, and the stratum containing the diamond is from this pursued in a horizontal direction. The roof is supported by wooden posts, but frequently falls in, to the imminent risk of the miners. They are worked by persons belonging to the aboriginal savage races. The Bugis resident merchants are the great dealers in diamonds. The petty prince of Mattan, in this island, is now in possession of one of the largest diamonds in the world, obtained 100 years ago from the mines of Landak. Its value is 269,378*l.*; being less than that of the Russian diamond by 34,822*l.*, and 119,773*l.* more than the Pitt diamond.

Rice, yams, and betel, together with all the fruit trees of India, are cultivated in this island. The cabbage palm is used for food. The forests contain trees of prodigious height, some excellent ship timber, and abun-

[a] Valentyn, Groot. Java, p. 44—46.

[b] "He has been deprived of two of his provinces, in which are situated the towns of Sammanap, Padakassam, and Sampan. He retains the western portion of the island, with the capital Maduretna, which has a population of 8 or 9000 souls."—M. B.

[c] Malte Brun. [d] Crawford, Vol. II. p. 241.

[e] "270 by 225 Fr. leagues."

[f] "The region of springs, (region des sources.)"

[g] Radermacher's Account of Borneo, in the Batavian Memoirs, III. 109. Pilon, ibid. II. 435. Beckman's Voyage to Borneo, London, 1718.

[h] "Monts Cristallins."

[i] Meinungen, Letters from Borneo, in the Freimuthige, a Berlin journal, 1811, No. 237.

[k] "5 to 20 Fr. leagues."

[l] "En partie noyés et mouvans," in part moving and inundated.

[m] "Succadana"

dance of the tree which yields the *sanguis draconis*, or dragon's blood.[a] Groves of nutmeg and clove trees are said to have been found in some mountains of the south-west.[b] The best known and most valuable species is the camphor tree, which grows here in all its perfection. It is the *Dryobalanops camphora* of Colebrooke;[c] a different tree from the *Laurus camphora*, the camphor tree of Japan. It grows near the sea-coast, and is found no where in the world except in the two great islands of Sumatra and Borneo. The Borneo camphor sells a third dearer than that of Sumatra; the one being 500*l.* per quintal, and the other 330*l.*[d] That of Japan is much lower. Benzoin, the resin of a species of *styrax*, is found in the same islands as camphor. The principal use of it is for incense in the ceremonies of the Romish, Mahometan, Hindoo, and Chinese worships. It is also used as a luxury in the houses of the great. The Javanese chiefs smoke it along with tobacco. The demand for this article has been steady in all ages. Borneo affords a plentiful supply of rattans, (*Calamus rotang.*) This is a prickly bush, sending forth shoots of amazing length. The manner in which the wood-cutter carries them off ready peeled, is sufficiently simple. He makes a notch in the trunk of any tree at the root of which the rattan is growing, and cutting the latter, strips off a small portion of the outer bark, inserts the peeled part in the notch, then pulls it through as long as its size continues uniform. One man will carry away 300 or 400 at a time.[e] Pepper, ginger, and cotton, grow here, and the nutmeg and clove are said to have been successfully cultivated.

It is in Borneo that the largest of the monkey tribe, the pongo, equalling the human race in stature, is found; also the ourang-outang, or *Simia satyrus*, which comes nearer to man in his looks, manners, and gait. Some have told us that this animal lights fires, at which he broils his fish and rice; but these accounts are not verified by recent observers.[f] The Borneans have an animal which they call the water stag,[g] which lives most generally in the marshy grounds, and, according to Pennant, is the largest variety of the *Cervus axis*. This island contains also two species of wild buffalo of immense size, wild boars, tigers, and elephants. The species of birds are innumerable, and most of them totally different from those of Europe. The swallows which build edible nests are in great abundance. Wild bees are so numerous that their wax forms a very large article of export.

The coasts are occupied by Malays, Javanese, Bugis,[h] or natives of Celebes, and some descendants of Arabs, who are all subject to despotic princes styled sultans. Mahometanism is the prevailing religion. The princes and nobles live in a style of barbarous pomp.

The kingdom of Banjermassin is the best known to Europeans, occupying the south side of the island. The large river Banjar flows through it. The present capital is Martapana. Here the Dutch have the post of Tatas, near the town of Banjermassin.

The west side contains the kingdoms of Landak and Sukadana. The king of Bantam in Java was formerly the sovereign, but resigned his rights to the Dutch company in 1778, and they established a military post at Pontiana. The sultan of Sambas is the most powerful prince of that coast, which is also the residence of different independent piratical chiefs.

Borneo, a town containing 3000 houses on the north coast, is the seat of a sultan who formerly reigned over the whole island. Here, as along the whole coast, the houses are often built on a sort of rafts, moored to the shore, so as to fall and rise with the ebbing and flowing of the tide.

The north-east coast belongs to the kings or sultans of Sooloo. Passir, in the south-east, is the chief commercial resort of the inhabitants of the island of Celebes.

The Malays of the coast, whose principal establishments we have now mentioned, consist of colonies which have come from Java and Sumatra. The interior is peopled with a race of the same original stock, but established for a greater length of time in the island. They are called Biajoos, properly Viajas,[i k] a term evidently Sanscrit, and synonymous with Battas, Weddahs, and Vyadjas,[l] the names given to certain old tribes[m] in Sumatra, Ceylon, and Indostan. Some others are called Malem, a Hindostanee term for mountaineers.[n] The specimens of their language which have been collected, contain many words common to the Malay and the Sanscrit;[o] a circumstance which throws additional light on the ancient consanguinity of all these nations. These natives[p] of Borneo call themselves Dayaks or Eidahans. They are fairer than the Malays, of tall stature, and a stout make; and extremely fierce and sanguinary in their character. Their principal people are in the practice of extracting one or more of their front teeth, and inserting pieces of gold in their stead. They paint their bodies with various figures; and a girdle round the middle is their only clothing. Their houses are large boarded huts without partitions; a hundred persons sometimes live together in one. The Biajoos hang the skulls of their enemies at the doors of their huts. A young man is not permitted to marry till he has either cut off the head or some other part of the body of an enemy.[q] In their mutual intercourse they observe strict regulations. Their women are treated with gentleness and consideration. They are dressed in a scarf, and wear an enormous bonnet or parasol of palm leaves on the head. Some of them display a distinguished talent for pantomimic dancing.[r]

One tribe of Eidahans, called Badjoos,[s] lives by fish-

[a] "There are some which furnish excellent timber, (*bois de construction,*) and others yield the gum called dragon's blood, (*sang-dragon.*)"—M. B.
[b] Valentyn's Account of Borneo, IV. 235.
[c] Asiatic Researches, Vol. XII.
[d] "12,000 and 8000 francs."
[e] Crawford, Vol. III. p. 423, 424.
[f] De Wurmb, Memoirs of Batavia, III. 250.
[g] "Cerf d'eau."
[h] "Bugasses."
[i] "Viadhjas."
[k] J. Janse de Rooy, in the travels of Vander Aa, quoted by Rader macher. Compare our former observations on the Battas, Weddahs, and other analogous tribes, p. 514.
[l] "Wedas and Vyadhias."
[m] "Sauvages," savages. This term is applicable to the Weddahs of Ceylon, but not strictly to the Battas.—P.
[n] Stuart, a Dutch resident. See the Batavian Memoirs, II. 436.
[o] Meinungen, l. c. No. 238.
[p] "Indigènes."
[q] "Avant d'avoir coupé soit une tête, soit les parties viriles d'un ennemi."
[r] Meinungen, *loco citat.*
[s] "Badchous."

ing. Their villages are built half in the water. The Tedongs, on the north-west coast, seem to be a colony from the Philippine islands, and are formidable for their piracies.

The Alfors[a] or Haraforas, a race belonging to the interior, seem to differ from the Eidahans only in having browner complexions, and extremely long ears. The dancing girls of this tribe are much admired by Europeans for the nimbleness of their movements, which, however, border on licentiousness.

Besides these different races, of which we know so little, there are also the Negrillos,[b] a tribe inhabiting forests inaccessible even to the Eidahans, and of whom no specimens have been hitherto seen by Europeans. These must belong to the Papuan or Oceanic negroes.

Several European nations had attempted to form settlements on the coasts of Borneo, but they had always been expelled or massacred by the natives; and from such particulars as are related to us of their conduct, they seem to have fully merited all their disappointments, being continually disposed to presume so much on their own superiority as to insult the natives indiscriminately. The Dutch, whose first attempts had suffered a similar fate, appeared in force on the coasts in 1748; and their fleet, though insignificant, so far awed the prince of Tatas, the only one who had pepper plantations in his dominions, that he granted them an exclusive privilege of trade in that article; only reserving to himself a right to give 500,000 lbs. of pepper to the Chinese. In consequence of this treaty, the Dutch Company has imported to Banjermassin, rice, opium, salt, and coarse cloths, but can scarcely defray, by this trade, the expenses of their settlement. Their chief profits are derived from the diamonds which they procure, together with 6,000,000 lbs. of pepper. The Chinese take an active part in the trade of Borneo. Diamonds, however, are in no request in China, so that the dexterity of this nation has not been applied to that branch of mining or of trade.

In 1706 the English Company was allowed to build a factory at Banjermassin, but abused their privilege so grossly, by domineering over the inhabitants, levying toll from those who passed up the river, and showing disrespect to the reigning power, that the natives burned the factory, and drove the English from the country. They were afterwards permitted to trade, on pretending to be private merchants; which they did with much greater success than while their odious self-protected establishment existed.[c]

In 1773 that nation formed an establishment in the island of Balambangan,[d] on the northern coast of Borneo, which was destroyed by the natives. It was renewed in 1803, but soon voluntarily abandoned.

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[a] "Alforèses."
[b] Negrillo, (Spanish,) a little negro.—P.

[c] Crawford, Vol. III. p. 223, 229. Beckman's Voyage to Borneo, 101.
[d] "Balamboang."

BOOK LV.

OCEANICA.

PART III.

NORTH-WESTERN OCEANICA CONCLUDED.

The Philippines, Moluccas, and Timorian Chain.

To the north of Borneo we find the great archipelago of the Philippine islands. They were discovered in 1521 by Magellan, who gave them the name of the archipelago of St. Lazarus. But the Portuguese seem to have known the island of Luzon in the year 1511.[a] The Spaniards, who established themselves here in 1560, gave the name of their king Philip only to the northern archipelago. The central part often receives the separate appellation of the Bissay islands.

The chains of mountains which traverse these islands in all directions, seem lost in the clouds; none of them have been measured. They are full of volcanoes. That of Mayon, in the island of Luzon, has the figure of a sugar loaf; this at least was the case some years ago. It continually emits smoke, and sometimes flames and volcanic sand. In the neigbourhood of the volcanoes of the islands Mindoro and Sangui, inexhaustible quantities of sulphur are found in large masses.

The land of the Philippine islands is not only diversified by numberless torrents, and many straits, like all mountainous archipelagos, but also presents the peculiarity of a great number of marshes, mossy grounds, and lakes. There is little regular firm land. During droughts the miry and spongy soil is full of chinks in all directions. Earthquakes occasion the most dreadful ravages. These islands are sometimes inundated by violent drenching rains, and are frequently exposed to hurricanes. Those which are felt at Manilla are nothing compared to those which occur on the coast of Cagayan.[b]

There is nearly the same variety of seasons here as on the coasts of Coromandel and Malabar, and arising from the same cause. The principal mountain chain runs north and south like the Ghauts.[c]

In the western parts, the rains prevail during the months of June, July, August, and part of September; the season of the west and north-west winds. The adjoining seas are tempestuous, the lands inundated, and the plains converted into wide lakes. At this time the easterly and northerly parts enjoy fine weather. But in October, and the succeeding months, the north winds, in their turn, sweep these coasts with equal fury, accompanied by an equal abundance of rain; the same inundations take place, so that, when the weather is dry in one district, it is rainy in the other.

Yet it is to this humidity that the Philippines owe their fertility. During the whole year the meadows, the fields, and the mountains, are clothed with perpetual verdure. The trees are always in leaf: the fields almost constantly enamelled with flowers; blossom and fruit are often exhibited together on the same tree.[d] The principal food in these islands is rice. Wheat was introduced by the Spaniards. The cacao or chocolate bean, which succeeds so admirably, was brought hither about the year 1670, and is cultivated by the Indians in all the islands. The sugar cane is common. The cinnamon tree grows in Mindanao. The European fruit trees, when planted in the Philippines, bear very little fruit, most of them none at all. The fig trees succeed, and attain to great beauty, but they are very rare. Oranges and citrons abound, and bear excellent fruit. The orange tree grows in the open fields to the height of thirty feet.[e] Among the indigenous plants are the cotton tree, the bamboo, the banana, the mango, the pine apple, ginger, pepper, and cassia. The wild banana, or *Musa textilis*, grows in natural groves, which are considered as property; and from the fibrous bark is manufactured a kind of cloth in frequent use with the natives. It also affords the material of the most valuable cordage obtained from any plant indigenous in north-western Oceanica. It is known to our navigators under the name of "Manilla rope;" and is equally applicable to cables, to standing and to running rigging.[f] The ejoo, obtained from the Aren palm, or *Borassus gomuti*, abounds in the Philippines.

These islands contain numerous herds of cattle. Hog's lard is used instead of butter, which last is not at all used, the keeping and milking of cows requiring too much attention for the indolent inhabitants. The forests abound in deer.

The numbers and varieties of fish are so great, that those of all the lakes, rivers, and seas in the world, appear to be collected here as in a focus. But the rivers are infested with crocodiles. The serpent called the "rice field bear,"[g] or *damonpalay*, contains a poison

[a] See our History of Geography, Book XXI.

[b] "Cagaya." Cagayan, or New Segovia, is a town on the N. coast of Luzon. There is another of the same name in Mindanao. The author does not particularize.—P.

[c] Voyage dans les mers de l'Inde, par Legentil, t. II. p. 8—12, et p. 334—360.

[d] Legentil, ibid. p. 25, &c.

[e] Legentil, p. 45, &c.

[f] Crawford's History of the Indian Archipelago, vol. III. p. 424, 425.

[g] "Ours de riziere."

under its teeth, which occasions immediate death.[a] There are swarms of the white ants, which sometimes consume a whole store in one night.

According to native traditions, all these islands, and especially Luzon, were once entirely possessed by negroes, who, when the other races arrived, fled to the mountains, which are still inhabited by their deseendants. The principal tribe is called Ygolots or Ygorrots. Others are called Finguians, Kalingas, and Italones.[b] We are told by a Jesuit, that these tribes are divided into two races, one of which comes nearer to the negroes than the other.[c]

About eighty years ago they were in the habit of coming down from the mountains to demand tribute, and they did not return till they had murdered some of the other inhabitants, whose heads they carried off to their own haunts. Legentil mentions that an act was then passed, by which a certain tribute was allowed them, along with free possession of their fields. More recent accounts say merely that the savages trade with the Spaniards, without taking notice of any tribute. They live on honey, roots, and game. Their clothes are made of the bark of trees. Their huts are sheltered by palm trees, but scarcely afford them protection from the rain. A few knives are their only utensils.[d]

The coasts are inhabited by a race not inferior in ferocity of character, though addicted to the pursuits of agriculture and commerce. The leading tribes are the Tagals, in the Island of Luzon, and the Bissays, in the central islands. The different dialects spoken by these nations bear a resemblance to the Malay, and perhaps also to the Chinese. The Tagals believe themselves to be a colony of Malays from Borneo. The practice of tattooing appears to be still continued, and was at one time so frequent, that the Spaniards, from this circumstance, gave some islands of the group the name of the Pintados.[e]

Nothing certain is known regarding the population of these islands. M. de La Perouse supposes it to be 3,000,000, M. Gentil not more than 700,000. Another conjecture is given by M. Raynal, who says, "that only 1,350,000 Indians have submitted to the Spanish yoke; that the greater part are Christians; and that all of them, from the age of sixteen to fifty, pay a capitation tax of four reals, about two shillings sterling."[f] The natives of the Philippines who are Christians, have, by their more intimate intercourse with Europeans, acquired a share of energy and intelligence superior to their Pagan and Mahometan neighbours, and to all the inhabitants of the more westerly islands of Oceanica, to whom, in former periods, they were indebted for their improvements. In intrepidity they also excel the people of Indostan. Hence, natives of Manilla are almost universally employed as gunners and steersmen in the intercolonial navigation; offices for which the continental Hindoos are at present incapable of being educated.[g]

The colony is commanded by a governor, subject to the viceroy of Mexico, who remains eight years in office. The trade between the Philippines and Acapulco, in Mexico, has for ages been conducted by a single galleon of 1200 or 1500 tons. It is a monopoly in which the cargoes are limited to half a million of dollars, (112,500*l.*) and never amounting, by connivance, to more than a million and a half, (337,500*l.*) or two millions, (450,000*l.*) They chiefly consist of the manufactures of China and Indostan, with the produce of the Spice and Sunda islands, for which Manilla is thus merely a place of transit. The ecclesiastical corporations have a large share in the investment. She sails in July or August, the voyage lasts between three and four months, and she returns in about half the time, with a million, or from that to 1,300,000 dollars in silver, some cochineal, cocoa, Spanish wines, oil, wool, and bar iron, but chiefly in ballast. Mr. Crawford, in stating the great losses sustained in this instance by commercial restrictions, mentions, that in a free trade, two annual voyages might be made, while under the present system there is only one.[h] A smaller vessel occasionally sails to Lima by the same route.

The largest of the Philippines is Luzon, the most northerly island of the group. It is indented by two gulfs, that of Cavite, or Manilla, on the west, and that of Lampon on the east. A great part of the space intervening between these in the interior is occupied by a wide lake called Bay, which discharges its waters into the gulf of Cavite. The largest river is that of Tagayo or Cagayan, which runs due north. The island produces gold, copper, and iron; the working of iron has been abandoned; gold is found in the form of sand or dust. The exports are ship-timber and masts, gomuti cordage, sugar, cotton, rattans, wax, gums, and resins.[i]

The city of Manilla[k] contains 38,000 inhabitants, including 1200 Spaniards. The streets are handsome, though unpaved. The inhabitants lead lives of ease and even of luxury. Every thing participates of the gay and simple spirit of the Indians. The suburbs are inhabited by Chinese and other foreigners. The motions of the sea being gentle, allow the front part of the houses to be built in the water. The transparent mother-of-pearl is sometimes used for windows. At Cavite, the port of Manilla, ships of war are built. Nueva Segovia and Nueva Caceres are episcopal cities.

The Tagals, erroneously called Indians, live in a state of plenty, tranquillity, and innocence, resembling the golden age. The indolent are enabled, by the munificence of their brethren, to dispense with every kind of labour. It is not uncommon for a man in good circumstances to maintain in his house a numerous train of relations belonging to different branches, who live in good terms with one another, and eat from the same dish. These large families, with the addition of strangers, sleep in the same room, on mats laid along the floor. The benignant character of the Indians extends its in-

[a] MS. Memoir of Rear-Admiral Richery.
[b] Voyage de Legentil, t. II. p. 51, &c.
[c] Bernardo de la Fuente, cited by Hervas, Catalogo delle Lingue, p. 99.
[d] MS. of M. Richery, p. 289.
[e] Crawford's History, vol. I. p. 218.
[f] "2 livres, 14 sous."
[g] Crawford, vol. II. p. 277, 278.
[h] Ibid. vol. III. p. 338—341.
[i] MS. of M. Richery. See also Blancard, Commerce des Indes.
[k] Voyage de La Perouse, t. II. p. 345.

fluence to the wealthy Spaniards. All the rich houses support two or three *creansas;* these are poor children, who are fed and clothed exactly like those of the family.

The character of the Spanish colonists at Manilla is drawn by some authors in very unfavourable colours. According to Legentil, the baths are conducted without the due regard to decorum, persons of both sexes bathe promiscuously, wearing very thin semi-transparent coverings. Opportunities are taken to make assignations while performing the civil office of lighting a segar for a friend, as the ladies commonly carry a lighted segar in their mouths. It is said to be a common thing for the priests to have acknowledged children. A due submission to the Catholic faith and forms is all the morality required to support a character.[a]

The Chinese have been at different times attracted to Manilla in great numbers, by its profitable trade. They have been much brow-beat and oppressed by the Spaniards; and in 1603, 25,000 of them were massacred. In 1639, having again increased to the number of 30,000, they were driven to revolt by oppression, and, in the contest, were reduced to 7000. In 1662, the island being threatened by the arms of Coxinga, who conquered Formosa from the Dutch, the whole of the Chinese were ordered away. In 1709 the Chinese were again expelled from Manilla, being ignorantly accused of monopoly, because they watched the state of the market, and exposed or withheld their goods accordingly, and also of carrying off the wealth of the Philippines to China. In 1751 they were again expelled by a royal order, in some measure extorted by popular clamour, but when the public began to suffer from the want of supplies and of trade, the measure was bitterly complained of, and the governor who carried it into effect subjected to public odium.

The accounts which we possess of the other Philippine islands present few characteristic features. In physical character, and in the genius of the people, they resemble Luzon. All those situated between Luzon and Mindanao go under the appellation of the Bissay Islands. Zebu is very populous and productive in rice. Its chief town is Guigan. It was in the small island of Mactan that the celebrated Magellan lost his life. The island of Buglas or Negros,[b] has received this last name from the circumstance of its containing a race of negroes in the interior.

Samar is one of the leading islands, lying to the south-east of Luzon. It has a fertile and easily cultivated soil, yielding, at least, a return of forty-fold, and exports large quantities of rice. The forests abound in wild birds; they contain three species of the turtle-dove, and many beautiful species of parroquets, some no larger than linnets.[c] The quadrupeds are also very numerous. The woods swarm with monkeys of very large size, wild buffaloes, and deer. Numberless hives of wild bees hang from the branches, and alongside of them are the nests of humming birds dangling in the wind.

The island of Panay is rich in game, especially in deer, boars, and wild hog.[d] In this, and the immediately surrounding islets, food and clothing are obtained by the Indians with the utmost ease. A species of banana fig affords a fibrous bark, easily separated by maceration. By joining the fibres together a cloth of fine texture is obtained, which at first is somewhat stiff, but becomes flexible by being treated with lime. This thread goes under the name of *abaca.*

Between the Islands of Mindoro and Palawan, is the group called the Calamian islands, or "the Islands of Canes."[e] The chain which these islands form, goes off from Luzon in a south-westerly direction. It seems to be very high and very narrow, the arable land at the bottom of the mountains being of very trifling extent. Their productions are rice, ebony wood, canes,[f] wax, several gums, pearls, fish in endless variety, and turtles. Some of the inhabitants live wholly at sea. The Spaniards have posts at Baco, in Mindoro, and some other places. All the modern maps give the island of Paragoa the name of Palawan, by which it was known to Marco Polo,[g] but D'Anville places the island of Balaba (Palaba, Palawa,) to the south-east of Paragoa. In Mr. Crawford's map, Palawan is marked among those which are under native jurisdiction.

The preceding islands are the only part of the archipelago of which the Spaniards hold the undisputed sovereignty. It is a circumstance worthy of remark, that the Philippines are the only islands of north-western Oceanica which have improved in civilization, wealth, and population, in consequence of their intercourse with Europe. When first visited, the inhabitants were a race of half naked savages, inferior to all the great tribes; but now they are in almost every respect superior. A monopoly of commerce happened to form no part of the Spanish policy. Private industry, though not altogether unshackled, has been allowed some scope, and private competition some operation. The government, finding here no spices, and no rich manufactures, satisfied itself with drawing a fixed capitation tax from its native subjects, which, however oppressive, did not extinguish the spirit of improvement. They also gave full freedom to European colonization, and freely distributed the unappropriated lands among the colonists. The consequence of this was, a free intermixture of the local society, and a communication of the genius and manners of Europe to the native races.[h]

The island of Mindanao, the most southerly of the Philippines, ranks the second for size and consequence. Its name (which is also written Magindanao) signifies in the language of the country, "the united people of the channel."[i k] It is properly the name of the capital of the principal state belonging to it. This island is about 830 miles[l] in circumference, but it contains little arable land. Gulfs and peninsulas give an irregularity to the whole coast. Pools and rivulets occur at every step. It has more than twenty navigable rivers, which abound in fish. The chief nutricious

[a] Legentil, quoted by Mr. Crawford, vol. I. p. 149, &c.
[b] Isla de los Negros, "île des Negres."
[c] "There are multitudes of lories, and of beautiful parroquets of the size of a linnet."— M. B.
[d] Sonnerat, Voyage aux Indes, t. III. p. 46. 8vo.
[e] "Isles aux Cannes."
[f] *Calamos*, (Sp.) whence the name of the group.
[g] "Nom déjà connu de Marc-Paul," a name known to Marco Polo.
[h] Crawford's History, vol. II. p. 447, 448.
[i] Forrest's Voyage to New Guinea.
[k] "De la Lagune" of the Lagoon or Lake. See Forrest.—P.
[l] "300 Fr. leagues."

plants are rice, sweet potatoes, and sago. Cinnamon is also very common. When fresh, it seems equal in aromatic power to that of Ceylon, but soon loses its strength, and in two or three years becomes totally insipid. The vine grows in the trellis way,[a] not admitting of any other mode of culture. It is not certain whether or not this island contains mines.[b] Great quantities of talc are found in it, and millstones are exported by the Spaniards.[c] There are numerous caverns, especially in the neighbourhood of the capital Mindanao, affording a retreat to bats, which are as large as common fowls. About sunset they issue in thousands from these caverns, which protect them from the heat and light during the day. From the earth polluted by their sojourning, a quantity of nitre is extracted.[d]

This island is ruled by its own kings and princes, who are styled sultans and rayahs. The nobles are called *Datoo*. The marshes and the forests present an insurmountable barrier to the enterprises of the Spaniards. The inhabitants of the interior are black savages, called Haraforas. Some represent them as cruel and bloody in their dispositions; others as a weak, timid, and oppressed race. They are the aboriginal inhabitants. Three tribes are distinguished by their language, the Luta, the Subani, and the negroes properly so called.[e] The inhabitants of the sea-coast have a great resemblance to the Borneans, the Macassars, and the people of the Moluccas. Dampier found the natives of Mindanao very subject to a cutaneous disease, in the form of white flakes and scurf over all the body.[f] They have a language peculiar to themselves, and also speak Malay. Their native idiom seems to be the Bissayan. They are all Mahometans; and have Imâms who teach their children to read and write. In their devotions they use many Arabic words.

The sultan of Mindanao is the most powerful prince in this island, but there are several petty independent sultans. The Mindanayans, when not at war among themselves, follow the occupation of pirates. Their vessels carry small guns, and crews of seventy or eighty men.

The settlement at Sambuangan is the only one which the Spaniards have kept. It is a town situated in the south-west part of the island, feebly defended by a small fort, and of little use to its possessors.

The island of Sooloo, or Suluk,[g] written Xullu by the Spaniards, though small, is one of the most interesting in this part of the world.[h] It lies to the south-west of Mindanao; it produces excellent fruits, elephants, and a small species of deer, the *Cervus axis*.

The sea in this neighbourhood throws up a great quantity of ambergris. It is said that before the coming of the Spaniards, the natives made torches with it to give them light while they fished during the night. It is thrown out on the shores of Sooloo, chiefly towards the end of the western monsoons. Some of it has been found in a liquid state. Whatever may be the origin of this substance, it is very curious that it should in this quarter be confined to the small island of Sooloo, and seldom or never found on the coast of Mindanao.

Sooloo derives wealth from its pearl fishery, which takes place at the end of the western monsoons. There is at that time a constant calm. The sea is so smooth that the eye can discern objects under water to a depth of forty or fifty feet. The natives of Sooloo are excellent divers, and nothing escapes them that comes within their view. But the Sooloo pearls labour under the disadvantage of tarnishing in a few years.

The sultan of Sooloo holds several neighbouring islands, and a part of the coast of Borneo. He keeps a small navy. Bowan, his capital, is situated in the north-west part of the island. It contains 6000 inhabitants, which form a tenth part of the population of the island. In 1628 and 1629 the Spaniards sent two great expeditions for the conquest of Sooloo, but both of them disgracefully failed. In 1637 they made a temporary conquest of Sooloo and Mindanao, which they were soon obliged to abandon. In 1751 they were beaten in their last attempt, and the natives of these islands joining their Mahometan neighbours, invaded the Philippines, and laid waste the Spanish provinces for three years.[i]

The islands situated to the east of Borneo and Java, and to the south of the Philippines, and extending to the immediate neighbourhood of New Guinea, are called by the French geographers the Moluccas, or Spice Islands.[k] The one of these names is by this extension completely alienated from its original and special meaning; the other is somewhat vague. But there are intimate physical relations, and old political ties, which justify us in grouping them as one archipelago. More divided and irregular than the Sunda Islands, they also contain a greater number of volcanoes. Trees, bearing more or less exquisite spices, seem to be diffused over the whole of them. The king of Ternati possesses the whole north coast of Celebes; and the governments of Macassar and Banda share with each other the Timorian chain. The Dutch of Batavia comprehend all these countries under the general name of *De Groote Oost*, or "the Great East."[l]

The largest of these islands is CELEBES, separated from Borneo on the west by the strait of Macassar; from the Moluccas, properly so called, on the east, by the Molucca passage. That portion of the sea on the north which lies betwixt this island and Mindanao, is sometimes called the Sea of Celebes, sometimes the Mindanao Sea.

The figure of Celebes is extremely irregular. The bays of Boni,[m] of Tolo, and, most of all, that of Tomini or Gunong-Tellu, divide it into a number of peninsulas connected by narrow isthmuses. The more our maps

[a] "En treille."
[b] Forrest's Voyage to New Guinea.
[c] M. S. of M. Richery.
[d] Forrest, in a Note where he quotes Combes, a Spanish Jesuit.
[e] Hervas, Cat. des Langues, p. 96.
[f] Dampier's Voyages, vol. I. p. 334.
[g] Joulo or Soulo.
[h] Dalrymple's account of the natural curiosities of the island of Sooloo, in his collection of Voyages, vol. I. p. 21.
[i] Crawford's History, vol. II. p. 471, 472.
[k] The term *Moluccas*, in its most extensive sense, comprehends, in English geographies, all the islands between Celebes and New Guinea, east of the Molucca passage. In a more limited sense, it is restricted to the Dutch Spice islands, Amboyna, Banda, Ceram, the Moluccas proper, &c.—P.
[l] See Valentyn.
[m] "Bony."

have been improved in correctness, the more ragged and skeleton-like does this island appear. It may be compared to a star fish, from which the radiating limbs on that side which lies to the west have been removed; and it is remarkable that the smaller island of Gilolo, adjoining to it on the east, has the very same singular form. The numerous gulfs confer on this island the advantage of a temperature mild for its equatorial situation, the heat being moderated by the copious rains and the cooling winds. The eastern monsoon lasts from May to November; the opposite one prevails through the rest of the year. The tides here are extremely irregular. Celebes contains several volcanoes in a state of activity. The bold, broken, and verdant coasts, present some charming landscapes. Numerous rivers fall in broken cascades at the feet of immense rocks, in the midst of majestic groups of picturesque trees. The most poisonous of known vegetables grow in this island. The famous *upas*, the existence of which in Java has given occasion to so many fables, grows also here; and the Macassars dip their poniards in its juice. Here also grow the clove and nutmeg trees, which the Dutch so avariciously engross, the ebony, the sandal, the calambac, the valuable woods of which are articles of export, the sago tree, the pith of which is used as an aliment by so many nations, the bread-fruit, and other fruit-bearing species. Rice and cotton are abundant. No elephants or tigers are seen in the forests, but many deer, boars, and, according to some accounts, elks or antelopes.[a] There is an infinity of monkeys of a very strong and very mischievous kind; and there is a large species of serpent, by which many of them are devoured. The cattle of Celebes are small, and have a hump on the back. The island also produces buffaloes, goats, and sheep, which are remarkably lively and sure-footed, being well accustomed to the mountain roads.[b] Besides the fishes common to the seas of Celebes with others in the same regions, we may remark that large quantities of turtle are taken on the eastern coast, for the sake of the tortoise shell, which is here a valuable article of commerce.

The minerals of this island seem deserving of attention. The southern part contains none; but the northern peninsula, from the isthmus to the district of Boolan and beyond it, is full of gold mines. Those in the district of Ankahooloo, near the Dutch settlement of Gorontala, yield gold of twenty-one carats; that found in the others is of eighteen. The ore is found in beds[c] at a depth of some fathoms, and is accompanied with copper.[d] Some of the mountains yield crystal, others iron. In the north-east, in the territories of Mongondo and Manado, certain districts which are liable to frequent destructive earthquakes, contain a soil which is filled with immense quantities of sulphur.[e]

The topography of Celebes is confounded amidst the contradictory accounts of travellers, who give totally different names to the numerous states into which it is divided.

In the south part, on the gulf of Boni, the two leading states are those of Boni and Macassar, or Mankashar. The best known place in the island is Macassar, a fortified town in possession of the Dutch. It is situated in the south-west, on a point of land watered by two rivers. One of these rivers is broad, and allows a vessel to sail up within half cannon shot of the town walls.

Bonthain is also in the south, on the bay to which it gives its name. It has a Dutch fortress immediately adjoining it. The Bay of Bonthain is large, and affords safe anchorage during both monsoons. The city of Boni is at a short distance from a lake which goes by the classical name of *Tempè*, and gives rise to a fine river.

The northern provinces under the jurisdiction of the Company, the capital of which is Maros, supply the whole island with rice. They contain 370 large villages, occupying the plains on the west coast.[f] Beyond the Gulf of Kaieli[g] the territory of the king of Ternati begins, comprehending the whole northern and eastern shores, as far as the Gulf of Tomini, and extending a considerable way along the shores of this gulf. This territory, which is able to furnish 17,000 soldiers, is divided among a number of vassal princes. The district which the Dutch call Paloo, a flat and fertile territory, is the Parlow of Captain Woodward.[h] Tolatola, a large town, according to an English traveller, is the Tontoly of the Dutch.[i] Magondo and Boolan are the largest states. Near Manado is Fort Amsterdam. On the Gulf of Tomini the Dutch have the settlement of Gorontala, in a country which abounds in buffaloes, in iron-wood, and in rattans, and where the nights are rendered very chill by the air of the mountains.[k] The Tomitans occupy the central part of the island where the gulfs terminate. Tambooko, and a part of the eastern coast, are possessed by the Badshoos,[l] a savage race, who spend a greater proportion of their time in their fishing-boats than on land.

The inhabitants of Celebes, who are distinguished into Booghiese, or Bugis,[m] and Macassars, are a vigorous and high-minded people. The very meanest of them are as impatient of a blow as any modern European gentleman, and their law allows any individual to revenge such an affront by the death of the person who inflicts it, provided he takes this revenge within three days. Among the more scrupulous even a haughty manner will not be tolerated. These principles generate a great deal of habitual politeness of behaviour. In cases of murder, the law of retaliation is urged to a greater length than in the other islands. Yet every murder may be compensated to the family of the deceased by a price which is fixed for persons of each condition. When it has been committed by a person of a different tribe, the injury is reckoned a public one, and the death of any individual of that tribe is deemed a sufficient reparation. The practice of running a muck, which is common in all the surrounding islands, is particularly frequent in this island. A person who has suffered a severe affront, especially if his life or honour

[a] "Même des élans, dit on;" and it is said, even elks.
[b] Valentyn, Description de Macassar. Radermacher, idem.
[c] "Nids," nests.
[d] Duhr, in the Batavian Memoirs, III. p. 179, 182.
[e] Valentyn, Moluques, vol. I. p. 64.
[f] Radermacher, Notice on Celebes in the Batavian Memoirs, IV. 215.
[g] "Cayeli."
[h] Woodward. Radermacher, p. 204.
[i] Woodward. Valentyn, Moluques, p. 72.
[k] Valentyn, Moluques, p. 79.
[l] "Badjoos."
[m] "Bonys or Boughièses."

is in danger, and he is laid under restraint or captivity, if any weapon is within his reach, lays hold of it without the slightest warning; sometimes with a hideous shout, immediately stabs those nearest to him, and, running about with an infuriated look, deals death among friends and foes indiscriminately, till he is himself put to death by some person, who thus performs an important service to society. The officers of police are furnished with three-pronged forks, for the purpose of overpowering persons in this unfortunate and desperate condition. In these islands it is dangerous to be seen running, as none run except persons in a muck, or thieves, and, when any one is seen to run, it is reckoned justifiable to pursue him and put him to death.[a]

The inhabitants of Celebes are better and braver soldiers than the other islanders. They have on different occasions made descents on Java, beaten forces more numerous than their own, and laid waste the country.[b] In this island every individual capable of bearing arms must appear in the field if summoned. War is determined in the council of the state; and the assembled chiefs take a solemn oath binding themselves to the prosecution of it. The banner is then unfurled and sprinkled with blood. Each chief in succession dipping his kreese in a vessel of water, drinks of this liquid, and dances round the bloody banner with wild motions, brandishing violently his bare weapon, and repeating the oath with dreadful imprecations.[c] In war their first onset is furious; but a resistance of two hours is sufficient to exhaust all their impetuosity. Some have inferred that their first efforts are made under the intoxicating influence of opium, which dissipates itself in these frenzied transports; but it is not necessary to have recourse to such a supposition in order to explain the fact, which is analogous to many other instances, varying in character with the physical constitutions and moral habits of different tribes. The kreese is their favourite weapon. They sometimes carry off the heads of their slain enemies as triumphant trophies to their wives and families, and on some occasions go so far as to devour the heart of an enemy. The Dutch governors have on some occasions had the barbarity to encourage their native allies to bring them baskets full of the heads of their enemies.[d]

The inhabitants of Celebes are rendered active, industrious, and robust, by an austere education. At all hours of the day, the mothers rub their children with oil or with water, and thus assist nature in forming their constitutions. At the age of five or six, the male children of persons of rank are put in charge of a friend, that their courage may not be weakened by the caresses of relations, and habits of reciprocal tenderness. They do not return to their family till they attain the age at which the law declares them fit to marry.

They are very much addicted to games of chance, in which they often stake their whole property, and afterwards their wives, their children, and their personal freedom. The disputes which arise at the gaming table are often terminated by the dagger, or generate incurable family feuds.

They are uncommonly fond of the sports of the field; deer and wild bulls being their principal game. Their country differs from most of the other islands in having extensive open grass fields adapted to the chase. These are the property of particular communities, and jealously guarded against the intrusion of strangers. As soon as the rice is sown, they collect for this purpose, mounted on small but active and hardy horses, forming companies of sixty, and sometimes as many as 200, and forget every thing else in the transports of the field.

Women in this island eat out of the same dish with their husbands, though always on the left side, and are in other respects treated on terms of equality. They appear in public without any scandal, mingle with the men at the festivals, take an active concern in all the business of life, are consulted on public affairs, and frequently raised to the throne, even where the monarchy is elective.[e]

The ancient natives of this island worshipped the sun and moon, and some local deities. They built no temples, deeming the canopy of heaven the only temple corresponding in magnificence to the leading objects of their sacrifices and devotions.[f] The influence of Hindooism existed but in a very limited degree. The Mahometan faith has now been established in the island for two centuries, and its priesthood possesses an extensive influence.

The governments in Celebes are not despotisms, like those of Java and the other islands; but aristocracies combined with elective monarchy, not unlike the late government of Poland. Boni is a federal state, consisting of eight petty states, each governed by a hereditary absolute chief, and the general government is vested in one of the number elected by the rest. These are his counsellors, without whom he can do nothing. They manage the public treasure, decide on peace and war, and the head of the confederacy corresponds in their name, not in his own. A woman or a minor may be raised either to the government of particular states, or to be the head of the general government, and in that case the constitution provides a guardian.[g]

All the other governments in the island are formed on similar principles, but with some variety. Among the Goa Macassars, ten electors, besides choosing the sovereign, nominate also an officer who can of his own authority remove the king, and direct the electors to proceed to a new election, or can remove any one of the electors. The Bugis state of Wajo, has a great council of forty princes. It is divided into three chambers, each of which elects two princes, who in their turn elect the chief of the confederacy, called the Matuwa.

The present sovereign of the Bugis state of Lawu, is wife to the king of Sopeng, another Bugis state; but the king does not presume to interfere in the affairs of the state which is subject to his wife. The wife of Kraing Lembang Parang, a respectable Macassar chief,

[a] See Crawford, vol. I. 67. III. 127.
[b] Crawford, vol. I. p. 231.
[c] Id vol. III. p. 233.
[d] Id. vol. I. p. 243.
[e] Id. vol. I. p. 73, 74.

[f] "The natives of Celebes acknowledged no other deities but the sun and moon. They offered them sacrifices only in the public squares, because they found nothing sufficiently precious for their temples."—M. B.
[g] Crawford, vol. III. p. 11, 12.

is sovereign of the small state of Lipukasi, and has the reputation of being one of the first politicians of Celebes, exercising great influence even on the armies by her spirited harangues.

The revenue in all the states is raised from the land, and consists of a tenth part of the produce.

The historical records of Celebes are more imperfect and limited than even those of Java. They lead us no farther back than 400 years. They seem to have reckoned time by the reigns of their monarchs, like the Chinese. The first positive date is that of the arrival of the Portuguese in 1512. Since this time their annals are filled with details of turbulence and violence. The Goa Macassar kings are put on record under names expressive of such scenes. One is called "throat-cutter;" another, "he who ran a muck;" another, "he who was beheaded;" a fourth, "he who was bludgeoned to death on his own staircase;" and a fifth is distinguished from all his fellows by having "died reigning," that is, a natural death.

The more civilized inhabitants are divided into the two great tribes of Macassars and Bugis, who are subdivided into small nations, that of Goa being the most eminent among the Macassars, and that of Boni among the Bugis. It was not till 100 years after the first visit of the Portuguese that the Mahometan religion was generally adopted, though a few Mahometans were found in the island in 1512. The Macassars, being the first converts, attacked Boni and Wajo, and forced them to embrace the new faith. The Macassars have been generally the most enterprising race. In 1655 they destroyed the Dutch settlement on the island of Butung. In 1660 the Dutch defeated them, though assisted by the Portuguese. By this exploit they put an end to the trade in cloves and nutmegs, which the Portuguese, after being driven from the Moluccas, had carried on through the medium of Celebes. The Macassars, in 1665, raised a fleet of 700 ships and boats, carrying 20,000 men, which conquered Butung and the Sooloo islands, and was proceeding to the Moluccas, when Admiral Speelman, with a fleet from Batavia, encountered and destroyed it. In 1672, Raja Palaka, who had fled to the Dutch, and by whose instrumentality the Dutch were made masters of the principal part of Celebes, was elected king of Boni, subjected several small states, and thus confirmed the European ascendancy. In 1710 the Goa Macassars were reduced to entire subjection by a Dutch expedition. In 1735, and some subsequent years, attempts were made by some bold characters to unite the Macassars for the expulsion of the Dutch. Goa was taken by a chief called Bontolangkas, assisted by the people of Wajo, but the Dutch retook it. In 1776, an adventurer, called Sankilang, raised a formidable rebellion in the island, which kept the country in a state of distraction for sixteen years. In 1811 the authority of the Dutch was transferred to the British. The kings of Boni being in possession of the regalia of Macassar, maintained an ascendancy in the affairs of the latter, by which the European authority was undermined. The king of Boni was defeated by the British in 1814, and the regalia delivered into their hands with great ceremony, for the purpose of being restored to the Macassars. They consisted of the following articles:—the book of the laws of Goa; a fragment of a small gold chain; a pair of China dishes; an enchanted stone; a pop-gun; some kreeses and spears; and above all, the revered weapon called the *sudang*, a kind of cleaver, expressly intended, as the natives say, "for ripping open bellies."[a] In 1816, Celebes was restored to the Dutch, along with the rest of their colonies.

The Chinese are the only foreigners permitted to trade with this island, to which they import tobacco, gold wire, porcelain, and raw silk. The Dutch import opium, liquors, gum lac, and fine and coarse cloths. Rice, wax in large quantities, slaves, *trepan*, a kind of marine animal substance belonging to the order of *mollusca*, and a little gold, are the exports which this island affords.

On the north-east a chain of islands extends between Celebes and the south-east point of Mindanao. The principal one is called Sanghir, which is said to be fertile and populous. It is occupied by a Dutch post. The island Siao,[b] and the Talautzi[c] group, form a chain along with Sanghir. These islands are rich in sago and oil of cocoa, and were said a century ago to contain 28,768 inhabitants. They contain two or three tremendous volcanoes.[d]

On the south coast of Celebes we find the islands of Salayer and Butung.[e] The latter forms a separate kingdom or sultanate. The capital of Butung is a fortified city. The inhabitants manufacture cotton stuffs, and make cloth of the fibre of *agave*. Its extensive forests swarm with parroquets and cockatoos. A species of nutmeg tree grows here, called by naturalists *Myristica microcarpa*, or *uviformis*, from the fruit being of small size, and in clusters like the grape. Much of the ground is overrun with rattans, which climb trees, then trail along the ground, and climb other trees in a long succession.[f] The fruit of the *Bombax ceiba*, or silky cotton, supplies the monkeys [g] with abundance of food.[h]

The Moluccas, according to the original and proper application of the term, consist of five small islands to the west of Gilolo, viz. Ternati,[i] Tidore, Motir, Makian, and Bakian or Bachian. But the sovereigns of the Moluccas had possessions in Gilolo, Ceram, and other islands in the neighbourhood, and these are called the Great Moluccas. The name seems to be of Arabic derivation, signifying "Royal Islands," because they were the places of residence of the sovereigns of the adjoining islands.

The archipelago of the Moluccas bears the most evident marks of a country overturned by one of those physical revolutions which naturalists call *debacles*;[k]

[a] Crawford, vol. I. p. 62, 63.
[b] "Siauw." [c] "Talautse."
[d] Valentyn, Moluques, p. 37—61. [e] "Boutan," Booton.
[f] "And thus form lines of many hundred yards (mètres) in length."
[g] "Singe pithèque." Pithecus (Geoffroy) a sub-genus including the orangs, gibbons, and chimpanzee.—P.
[h] Labillardière, Voyage à la Recherche de La Perouse, t. II. p. 301.
[i] Ternate.
[k] This is not in the original. The author simply says, "overturned by some violent convulsion." The term *debacle* is applied to a powerful diluvial torrent, which is supposed to have swept the earth's surface, and to have carried blocks of granite, and other rocks, from their beds, and the remains of animals and vegetables from their original localities. But the appearances, in the Moluccas, are rather the effects of volcanic agency, and such is evidently the opinion of the author.—P.

containing islands broken and indented in a singular manner; enormous peaks, rising abruptly from a deep sea; rocks piled up to immense elevations; and a great number of volcanoes, some of which are in a state of activity and others extinguished. The earthquakes, which in these regions are frequent and dreadful, render the navigation dangerous; for not a year passes without the formation of new sand-banks, and the disappearance of old ones.

The heat, attended with excessive moisture, followed by long droughts, and the nature of the soil, which is rocky or spongy, prevent the cultivation of the *cerealia*. The pith of the sago tree serves for bread to the natives. The bread-fruit tree, the cocoa-nut, and all the fruit trees of India, succeed in them. The *Pterocarpus draco*, or Lingoa, is a native of these islands, being seldom found in the west. It is used as a substitute for the teak. It is also cultivated for its fragrant blossoms, which are much esteemed. The wood of some of its varieties is so highly perfumed as to be used as a substitute for sandal. Though less hard and durable than teak, it is handsomer, and therefore fitter for cabinet work. The enormous excrescences which grow on it are wrought into beautiful articles, equalling in lustre the finest variegated marble. In these islands the best gamuti, or ejoo, is found; the fibrous substance obtained from the aren palm. It is less flexible than that of the coir or cocoa-nut husk, but more durable, and therefore better adapted for cables and standing rigging, though less fit for running rigging. The native shipping of all kinds is entirely equipped with it, and for large European vessels it is found to make good cables. It resists, in a remarkable degree, the influence of heat and moisture, and of the changes in these respects to which it is exposed, and therefore needs no tar or pitch. The spice trees, however, are the objects by which the avarice of Europeans has been principally attracted to this part of the world.

The clove tree, (now called by botanists *Eugenia caryophyllata*,) is about forty or fifty feet high, with long pointed leaves like those of the laurel. Some compare its appearance to that of the beech. At the beginning of the wet season in May it throws out a profusion of leaves. Soon after the germs of the fruit are to be seen at the extremities of the shoots, and in four months the cloves are fully formed. The fruit, at first of a green colour, assumes in time a pale yellow, and then a blood red. At this period it is fit to be used as a spice, consequently this is the clove harvest. But to ripen sufficiently for the purposes of propagation, it requires three weeks longer; in which period it swells to an extraordinary size, loses much of its spicy quality, and contains a hard nucleus like the seed of the bay. It is now called "the Mother Clove." There are five varieties of this fruit. It has a more limited geographical distribution than any other useful plant. It was originally confined to the five Molucca island, and chiefly to Makian. It had been conveyed to Amboyna a very short time before the arrival of the Portuguese. Not partial to large islands, it does not grow well in Gilolo, Ceram, Booro, or Celebes. It has been cultivated, and has produced fruit, in the western part of Oceanica. It has also borne fruit, though of inferior quality, for these fifty years in the Mauritius. Even at Amboyna the tree is not productive before the tenth or twelfth year of its growth, and requires great attention; whereas in the parent islands it bears in its seventh or eighth year, and requires very little care or culture. It neither thrives near the sea nor on the high hills. The gathering, the drying, and the packing of it, are all as simple operations as possible; and very little care is required for its preservation as an article of commerce.

The other valuable species is the *Myristica moschata*, or nutmeg tree; which, in its general appearance, resembles the clove tree, only it is less pointed at the top, and its branches are more spreading. Its leaves are similar to those of the pear tree, but larger, and, like all those of the nut tribe, dark green on the upper surface and grey beneath. After small white flowers, it produces a fruit very similar, in form and colour, to a nectarine. When ripe it resembles a ripe peach, and, bursting at the furrow, discovers the nutmeg with its reticulated coat, the mace, of a fine crimson colour. The external pulpy covering has an austere astringent taste. Within the mace is the nutmeg, inclosed in a thin shell of a glossy black, and easily broken. It has eight varieties, which appear to be permanent. The limits of its geographical distribution are much wider than those of the clove. It grows in New Holland, in the south of India, and in Cochin-china; but in these countries it is void of flavour; and for all useful purposes its geographical limits are nearly as narrow as those of the clove, and indeed almost exactly the same. The cultivation of the nutmeg is nice and difficult. The best trees are those produced by the seeds voided by a blue pigeon, called the nutmeg bird, by the excrement of which its growth is much facilitated.

In this part of the world there are several minor spicy productions which are found in no other country; viz. Massoy bark, used for culinary purposes by the Malays and Javanese, and of late in request in China and Japan. The *Laurus culilaban* also yields an aromatic bark. The leaf of the *Melaleuca leucodendron*, or cajeput tree, is well known to yield a fragrant essential oil.

The most remarkable animals in these islands are the barbyrossa,[a] the opossum, the phalanger, the Indian jerboa,[b] and the chevrotain[c] or *Moschus pygmæus*. There are but few domestic animals. The eye is delighted with the magnificent plumage of some of the birds, such as the birds of paradise, the king-fishers, the different parroquets, cockatoos, and others. We know little of the minerals of these regions.

The natives of the Moluccas, before they were visited by foreign nations, attached no value to the vegeta ble riches which are peculiar to their islands, and which have rendered them at once so celebrated and so unfortunate. The Chinese first accidentally landed in the middle age, and discovered the clove and the nutmeg, in consequence of which a taste for these commodities was soon diffused over India, and thence extended to Persia and to Europe. The active Arabians, who then engrossed almost all the commerce of the world, turned their attention to the native country of these precious commodities, and repaired to it in numbers; when the Portuguese, who always followed close behind, wrested the treasures from that nation. In 1521, Antonio de Brito first appeared in force in the Moluccas, for the

[a] Babyroussa. [b] Tarsier.

[c] "Le petit chevrotain" Pigmy musk

express purpose of taking possession of them in the name of the king of Portugal. The unsuspecting sovereigns received their treacherous guests with caresses, but soon found cause to entertain very different sentiments towards them. One of the first acts of the commander was to imprison some of the followers of Magellan, who had been left in this part of the world, because they belonged to the hostile nation of Spain. A system of violence, intrigue, and perfidy towards the natives, was immediately begun and continued for sixty years, with the single exception of the two years of the government of the virtuous Galvan. At the end of that period the Dutch, with the assistance of the natives, drove out the Portuguese; but they soon discovered a rapacious policy equally oppressive. In 1606 the king of Ternati attempted to league the different princes for their expulsion, but the jealousies of his neighbours defeated his intentions. In 1613 the intrigues of the Dutch procured for them, from the native princes, an exclusive right of buying cloves. Every infraction of these iniquitous compacts was resented; and from this cause the country was now desolated for seventy years with wars and invasions. The natives displayed much bravery, but were finally subdued. The Portuguese and English sometimes interfered, and their policy wavered according to the prospects which events at different times held out to their base avarice. The English were allowed at one time to have a mercantile establishment at Amboyna, when held by the Dutch. But the latter, in the year 1623, after forcing some Chinese and Javanese soldiers, by the torture, to make confession of a plot on the part of the English, seized on the whole of the English residents, and put them to death with circumstances of indignity and cruelty sufficient to disgrace any barbarians. In this unfortunate island Governor Vlaming, one of the most detestable monsters that ever colonial depravity can boast of, carried on a scene of bloody executions, putting to death people, nobles, and priests, by dozens, in all the different forms of cruel death; strangling, breaking on the wheel, drowning in the sea, and beating to death with bludgeons. Those who were taken prisoners, and those who surrendered under promise of pardon, shared the same fate.[a] It was not till 1680 that the Dutch, by completely crushing the natives, carried the principles of their commercial policy into rigid practice.

While the culture of cinnamon was confined to Ceylon, that of the clove was confined to Amboyna, and that of the nutmeg to the Banda islands. It was not till 1778, when the plantations at Banda were greatly damaged by an earthquake, that the Company allowed the nutmeg, as well as the clove, to be cultivated in Amboyna.

In consequence of this monopoly of cloves and nutmegs, the quantity produced is greatly diminished, and the price enhanced. The particulars of this department of mercantile history are given in detail in the enlightened work of Mr. Crawford, and the inferences are luminously drawn, pointing out the ruinous tendency of all those cruel and unjust measures. The price given for cloves to the cultivator is $3\frac{1}{4}$d per lb. avoirdupois, nearly eight dollars per picul of $133\frac{1}{3}$ lbs. When the trade was conducted by the natives, it even sold in Java at an average of fourteen dollars per picul. When the article arrived by a difficult and hazardous land-carriage to the Caspian Sea, it cost 91 dollars; at Aleppo 141; and in England 237. Since the close monopoly of the Dutch, *i. e.* since 1623, the price paid for cloves to the Dutch on the spot has been eight times the price paid by them to the cultivator. When brought directly to England, they are sold at an advance of 1258 per cent. on the natural export price. Concerning the quantities produced, our information is not exact During the Portuguese and Spanish supremacy, the five Moluccas produced annually 2,376,000 lbs. When the trade was free, the quantity was one half more. The whole produce at present does not exceed 700,000 lbs. Before the last time that the islands fell into the hands of the English, Europe consumed annually 553,000 lb; since that time about 365,000. The duty imposed in England was then more than twenty fold the price of the commodity where it grows. The price indeed fell, but not in proportion to that of pepper, and other analogous articles. The quantity now consumed in England exceeds that consumed in 1615 by 56 per cent.; but, if the trade had been free, it ought in the present state of wealth and luxury to have increased in the proportion of 147 per cent., that being the case with pepper.[b] The Dutch monopoly has occasioned a cultivation of cloves in Bourbon and Cayenne, which would immediately cease if the Molucca trade were laid open, the produce being so much inferior.

The same principles operate on the trade in nutmegs. In the ancient commerce, down to the establishment of the monopoly, nutmegs were always sold and transported in the shell, and the natives, when left to themselves, are still disposed to continue that practice. The Dutch, to secure their monopoly more effectually, subject them to processes which destroy the powers of germination, consisting in slow kiln-drying and smoking for three months, and immersion in quick-lime and salt water, with drying, which require two months longer. This process is attended, not only with loss of time and labour, but with great waste, and other inconveniences. The kernel is exposed by it to the depredations of the nutmeg fly. It is estimated that a tenth part of the produce perishes in consequence of the separation of the shell. The English, when they conquered the Spice Islands in 1810, found in store more than 37,000 lbs. of bad, broken, and rotten nutmegs. The natural price of the article ought not to exceed four dollars per picul, or $2\frac{1}{2}$d. per pound, and in Europe the pound should not exceed 6d., but is in general twelve times that price; and in England, duties included, seventeen times as much. Mr. Crawford, while he details these, among other important circumstances, observes, that "the consumer pays this price for no other purpose than that a political juggle may be played, by which the party who plays it imposes on itself, without gaining any advantage whatever, while the grower is cheated out of his property and out of his liberty." The consumption of nutmegs, as well as cloves, in Europe, is smaller at the present day than in the middle ages. Black pepper and ginger have in a great measure taken their place,

[a] Crawford's History, vol. II. p. 440, 441.

[b] Crawford, vol. III.

and, above all, the pimento and Chili commodities, unknown to Europe before the discovery of America, and of the route by the Cape of Good Hope. The following is the state of the nutmeg trade at different periods :

	lbs.
Consumption of nutmegs in all Europe in 1615,	400,000
Do. of mace in do.	150,000
Consumption of nutmegs in England in 1615,	100,000
Do. of mace	15,000
When the monopoly first fell into the hands of the English in 1796, the consumption of nutmegs in Europe was	85,960
And of mace,	24,234
Consumption of nutmegs in England,	39,071
Of mace,	5,400
When the monopoly was last in the hands of the English, in 1811, the consumption of nutmegs in Europe was	214,720
Of mace,	[a]250,040
Consumption of nutmegs in England,	56,960
Of mace,	3,620

We shall now give a description of the individual islands of this archipelago. Gilolo has an irregular form, representing Celebes in miniature, the irregularities and incursions of the ocean lying on the eastern side of both. Its interior contains some lofty peaks. It abounds in buffaloes, goats, deer, and boars, but contains very few sheep. Many bread-fruit trees grow in it, also the sago tree, and probably some clove and nutmeg trees, notwithstanding the assiduity with which the Dutch exert themselves to extirpate these species. One of the principal towns is Satanag, which is situated on a small promontory on the east side, and is only accessible by means of steps. The sultan of Ternati seems to hold the sovereignty of the north part of this island, while the southern part belongs to the sultan of Tidore.

The north end of Gilolo is separated by a narrow channel from the beautiful island of Mortay, which has few inhabitants, though covered with sago trees, which are cut down by the people of Gilolo.

The Moluccas proper form a chain situated on the west side of Gilolo, in a line parallel to the direction of its coast. The most northerly, and the principal of these islands, is Ternati, though not thirty miles[b] in circumference. Its sultan reigns over Makian and Motir, the north part of Gilolo, Mortay, some parts of Celebes, and a part of Papua, or New Guinea, from which he draws a revenue of gold, amber, and birds of paradise. He can command an army of 80,000 men. The government is a mixture of three forms. The nobles and the commons are represented by magistrates invested with great power; but the Mussulman clergy, having obtained seats in the senate, have rendered its sittings tumultuous and anarchical.[c]

Ternati consists chiefly of elevated grounds abounding in springs: the tops of the mountains are lost in the clouds. It contains a volcano, which had a violent eruption in 1693. Its birds are remarkable for their uncommon beauty, especially the king-fisher, of a red colour mixed with sky-blue, and called by the natives "the goddess."

The island of Tidore resembles the preceding, but is somewhat larger. Its sultan is not so powerful as the other, possessing only the south of Gilolo, Mixoal, and some inferior islands.

Motir, according to an early writer, was formerly the asylum of Venus and of pleasure. The island of Makian contains a volcano, the crater of which has the form of a long crevice, reaching to the foot of the mountain. Bachian is the largest of the Moluccas proper. It is governed by a sultan, who also possesses Oby,[d] Ceram, and Goram; but he is more dependent on the Dutch than the other two princes. The coasts, like those of most of the islands of this archipelago, are surrounded by coral rocks of great beauty and infinite variety.

Between Gilolo and Ceram we find the island of Oby, which originally abounded in clove trees. The Dutch keep a small fort on its west side. Its inhabitants consist in a great measure of slaves who have escaped from Ternati.

In Mixoal, or Mysoal, which lies near the great Papua country, the villages are built on posts in the water. Its woods contain beautiful birds of paradise, which seem to come from New Guinea.

The three Zula[e] islands named Taliabo, Mangola, and Bessi, form a group lying between the Moluccas and Celebes. Abounding in sago and ebony wood, they contain a population which has the character of being exceedingly treacherous and indolent. On the shore of one of the channels which separate them, there is a rock resembling the human form, which is an object of adoration to the Malay seamen.[f]

The island of Booro rises abruptly from a very deep sea, and has the appearance of being surrounded by a wall. It is seen at the distance of seventy-six miles.[g] In the interior, the Alfoors,[h] a race of gentle and timid savages, live on the banks of a circular lake, which appears to rise and fall like that of Cirknitz. An islet sometimes appears and disappears again in the middle of the lake.[i] The atmosphere in the interior is exceedingly humid. The trees are overrun with moss, and seats like little altars, covered with that substance, surround the fountains. This island contains buffaloes, deer, and barbyrossas. Among the trees are a green-coloured ebony, a kind of iron-wood, and teak.[k] In these solitary places, probably the clove, and perhaps the nutmeg also, defy the avarice of mankind. The town of Cayeli, called also Booro, is handsomely built on a bay which affords good anchorage.

The island of Ceram is 186 miles long, and thirty-six or thirty-eight broad.[l] Forrest tells us expressly that Ceram still produces cloves. It has large forests

[a] This statement, by the translator, of the quantity of mace, is apparently erroneous. In his other statements, and in all which I have seen, the quantity of mace is inferior to that of nutmegs, and it must be so, as the produce of the former is necessarily smaller. I subjoin a few other statements, to the same purpose. Between 1796 and 1798 the English East India Company imported 93,732 lbs. of nutmegs, and 46,730 lbs. of mace. During the last century, the average annual sales of the Dutch were 250,000 lbs. of nutmegs, and 90,000 lbs. of mace, in Europe; 100,000 lbs. of nutmegs, and 10,000 lbs. of mace in the East Indies.—P.

[b] "10 Fr. leagues."

[c] Valentyn, Moluques, p. 98.

[d] "Ouby, Oubi."

[e] "Xulla or Xoula."

[f] Valentyn, Moluques, vol. I. p. 88.

[g] "28 Fr. leagues."

[h] "Alforèses."

[i] Leipzig and Keller's Journeys to the Lake of Booro, in Valentyn, Amboyna, vol. II. chap. II. p. 16—27.

[k] Labillardière, vol. II. p. 295.

[l] "67 by 13 or 14 Fr. leagues."

of sago, an article which constitutes a considerable object of export. This is the humblest of the palm tribe, except the *nipa*, and the thickest except the gomuti. While under a height of five or six feet, it is covered and protected by sharp spines, which afterwards drop off. Before it reaches its full growth, the stem consists of a thin hard case, about two inches thick, and an enormous volume of spongy pith, like that of the elder. This is the edible farinaceous substance, the bread of the islanders. When the tree attains maturity, this mealy pith disappears, and the stem is reduced to an empty shell. It grows in low marshy situations, and thrives best in knee-deep bogs. This part of the archipelago, where the eastern monsoon is boisterous and rainy, is its true native country. It is most abundant in those islands which are most distinguished for the production of the clove and the nutmeg, and its geographical distribution seems nearly co-extensive with that of these spices. Ceram is most of all distinguished for it. The tree is generally ready to be cut down for sago when about fifteen years old. After being cut down, it is divided into convenient lengths, split, and scooped out; the pith is separated from the fibrous matter by means of water, in which it falls to the bottom. To make it keep well, it is formed into dense cakes, by means of heated moulds. In this form, the largest quantities are consumed and exported. The finest of the meal is made into a paste with water, which is then rubbed down into small grains. When constantly used for food, it is found both by the natives and others inferior to the farina of the *cerealia*. The hard woody shell of the trunk is used for building houses and bridges, and making troughs and other vessels. The stem of its branches is more extensively used in carpentry. The refuse of the pith is given to the hogs. When thrown into heaps it putrefies, and a delecate edible mushroom grows on the heaps. In this putrefaction a white worm is also generated, which the natives consider as delicate eating, and some Europeans have also learned to relish.[a] One tree will sometimes yield 500 or 600 lbs. avoirdupois of sago. The average is supposed to be 300 lbs. If each tree is ten feet asunder, which the cultivated palms generally are, an acre, when cut down, will yield 120,500 lbs. or 8000 lbs. a year.[b]

This island has been little visited even by the Dutch, whose dominion over it is not complete. Valentyn represents in ten or twelve plates[c] the enchanting aspect of several parts of the coast, particularly Lissa-Bata on the north coast, at the foot of a mountain, rugged with awful ravines. At the west end there is a peninsula called Howamchel by the Dutch, and Veranola by the Portuguese, which contains two beautiful places, called Lochoc and Cambello.[d] The north-east coast is covered with the *casuarina* tree. The trees, hung over ravines resembling a profound abyss, where torrents are roaring beneath, meet to form bridges, without which the inhabitants of different districts could not keep up any mutual intercourse. In other places the villages are situated on terraces, which are ascended by long stairs. Among the rocks is found a grey stone, capable of enduring the strongest furnace heat. There are also large hills of chalk, down which rivulets pour, which are impregnated with that substance.[e]

The island of Ceram is traversed from east to west by several parallel chains of mountains, one of which seems to be more than 8000 feet above the level of the sea. The deep forests abound with birds, among which is found the cassowary.

Of the inhabitants of Ceram, the aborigines, called Alfoors, are the most deserving of notice. The only dress of the men is a girdle encircling the loins. They fix bunches of flowers and palm leaves to the head, shoulders, and knees, and wear square bucklers, which they ornament with considerable taste. The young men court the favour of their mistresses by presenting them with five or six of the heads of their enemies. In order to seize their victims by surprise, they lie in ambush in the woods, cover themselves with moss, and hold branches of trees in their hands, which they shake in a manner so natural that they have the appearance of real trees; they allow the enemy to pass, assassinate him by coming up behind him, and cut off his head, which they carry off, flying with great rapidity.[f] They are received by the people of their village with all the honours of a barbarous triumph. The eyesight of these people is uncommonly acute, and their swiftness is such as to enable them to chase the wild hog with success. Rats and serpents form part of their food. They never marry more than one wife, and are strangers to the disorders of debauchery. The nation is governed by three princes, and occupies the whole interior of the island. A king of these Alfoors gave a very singular entertainment to a Dutch preacher, of the name of M. Montanus. After receiving him with great demonstrations of joy, and treating him with the most splendid repast that the resources of the country could afford, the prince ordered a number of men armed with swords to step forward. They performed a war dance; and, after a few feats of this sort, commenced a serious fight; their swords clashed, blood flowed, and some of their bodies were laid dead on the ground. The peaceful minister of religion, shocked at the horrid spectacle, entreated the king to put a stop to it. "It is nothing," was the reply, "they are my slaves: it is only the death of a few dogs. Happy shall I be if this mark of my high respect convinces you of my eager desire to please you." This, however, was not more barbarous than the gladiatorial shows among the Romans.

The small but important island of Amboyna, on the south of Ceram, claims our particular attention. It is fifty-five miles[g] long. A large bay divides it into two peninsulas, giving it a shape not unlike that of a blunt pair of compasses or forceps, or the bill of a bird half opened. When lately taken by the English, it was found to contain 45,252 inhabitants, of whom 17,813 were Protestant Christians, and the rest Mahometans, excepting a small number of Chinese and savages. It is occupied by mountains of moderate height, principal-

[a] The ancient Romans reckoned some wood worms dainties.
[b] See Crawford's History, vol. I. p. 386—390.
[c] "Une dizaine des vues."
[d] Valentyn's Map of the Government of Amboyna.
[e] Valentyn's Description of Amboyna, ch. II. p. 35—70.
[f] Ibid. ch. III.
[g] "20 French leagues."

ly in the east end, where the two peninsulas meet. Its fields are watered by several streams, enlivened by numerous hamlets, and embellished by valuable crops. The soil is composed of a reddish clay, sometimes black and sandy, particularly in the narrow valleys. Several of the rocks are composed of a brittle slate, accompanied with very hard asbestos. A beautiful fine-grained granite forms the basis of several of the hills. At an elevation of nearly 1000 feet,[a] are found calcareous stones of a pure white.[b]

The celebrated Rumphius has given a flora of this island, to which Labillardière has subjoined some new remarks. The clove is always the principal plant cultivated in it. There is a small quantity of coffee, and which is not of the best quality. The greater part of the marshy grounds are employed in the cultivation of the sago tree, from which are obtained sago, wine, sugar, and cordage. Among the best fruits may be mentioned several sorts of *litchi*, such as the rambootan of the Malays, (the *Nephelium lappaceum*,) several varieties of *banana*, oranges, guavas, papaw trees, the beautiful *Laurus culilaban*—the ornament of the shores—a tree which yields by distillation an aromatic oil which is in great request.[c] The tallest tree of the forests is the *Canarium commune*. The *Eleocarpus monogynus*, though overtopped and shadowed by the surrounding trees, is covered with elegantly formed flowers down to its lowest branches. In these solitary forests, the close foliage of which scarcely allows the light of the sun to penetrate, we observe a wonderful vivacity of colours in some parasitical plants, belonging to the family of *Orchideæ*, most of which adhere to the trunks of large trees. In places less crowded with exuberant species, we find the *Cussonia thyrsiflora* arising to adorn these enchanting scenes with its broad palmate leaves. Among the most common trees or shrubs we may take notice of the henné, which is applied to the same uses in Egypt, Turkey, Arabia, and all the east, that of staining the fingers of the women; the *Chalcas paniculata*, the champac, several species of the *Uvariæ* and the Arabian jessamines, which, rising among those delightful trees, mingle their pleasant odour with the other delicious perfumes.[d] In the marshy grounds, and along the banks of the rivers, we find such aquatics as the *Jussiæ tenella*, the mangroves, and the *Acanthus integrifolius*. From the bastard aloe the inhabitants procure thread for domestic use. Several gardens are adorned with the Chinese boxwood, formed into beautiful rows along the walks. *Justiciæ* and variegated turnsoles here display all the beauty of their flowers and their foliage. On the sides of steep sandstone rocks, towering above the waters of the ocean, grows the *Pandanus ordoratissimus*, suspending over the sea its large globular fruit, which, when arrived at maturity, falls down, and lies thick strewed on the surface. To heighten still more the beauty of these delightful places, we see there the brilliant red flowers of the *Erythrina corallodendrum*.[e] The sea is peopled with brilliant shell-fish and other singular species, and its shores are covered with crabs and lobsters without number.

The city of Amboyna, the capital of the island, is situated at the south-west extremity. Its regular streets, its canals, and its bridges, give it very much of a Dutch aspect. The citadel is a place of great strength, and, next to that of Batavia, the most important in this part of the world.

The natives, who are descended from the same stock with the Malays and Javanese, have adopted the practice of wearing tight vests and breeches. They are fond of the bath, and rub their bodies with odoriferous oils. The women load themselves with golden bracelets, of an endless diversity of forms, and adorned with crystals. In personal charms, in elegance of manners, heightened by the lustre of their flowing dress, and in all but their complexion, they make some approach to our ideas of the ancient Greeks. Their dances are enlivened with songs, which are frequently descriptive of the historical events of their country. These songs often take the form of dialogues, like the *ambœbeon* of the ancients. An Amboynese, called Ridjali, has written in the Malay language the history of one of the districts of the island. But several of its ancient customs have been abolished by the strict notions of the Dutch ministers.[f]

Among the islands adjoining Ceram and Amboyna we must notice the following: Noosa Laoot, the inhabitants of which, in 1708, were still cannibals, and valued the human cheeks and palms of the hands as the most delicious morsels;[g] Honimoa, a fertile island, containing a Dutch fort; and Oma, which abounds with thermal springs. These three islands are to the east of Amboyna. To the west of Ceram, we have Manipa, Kelang, and Bonoa, which are covered with cocoa and ebony trees, and rice fields. Bonoa is properly a circular group of islands, forming a good harbour in the centre. In Manipa there is a fountain called Ayer Sampoo, "the well of oaths," which is believed to give the itch to any perjured person who drinks of it.

To the south-east of the island of Amboyna, is a small and distinct volcanic group, taking the name of Banda from the leading island, which is also called Lantor. The nutmeg tree is cultivated chiefly in Nera, Gonong, Ay or Way, and Lantor or Lontor. This celebrated species, which delights in a black mould, grows also amidst the lavas of Gonong, the highest of all the islands, its summit being 1940 feet above the sea.

On the island of Pulo Ay, the stones of mysterious origin, called aërolites, or atmospheric stones, because they are believed to proceed from the atmosphere, frequently make their appearance.[h] The frequency of their occurrence in the Moluccas may seem to countenance the opinion which assigns to these bodies a volcanic origin.

On the east of Banda there is a chain of islets, extending from the east point of Ceram to a group of three larger islands, to which the Dutch give the name of "The Keys." These are near the eastern termina-

[a] "300 metres."
[b] Labillardière, t. II. 309—311, &c.
[c] Ibid. t. II. p. 325
[d] Ibid. t. II. p. 292.
[e] Ibid. t. II. p. 332.
[f] Valentyn, Amboyna, p. 124, 152, 164, &c.
[g] Ibid. p. 124, 152, 164, &c.
[h] Aërolites or thunder stones often fall in the island of Pulo Ay M. B.

tion of an important chain of large islands, which, from Timor, we have called "the Great Timorian Chain." Taken in an enlarged view, this chain begins with Sumatra, and includes Java as well as all those islands, large and small, which lie between Java and Arroo, forming along with them one magnificent sweep ; but, as Sumatra, Java, and Borneo, derive importance and peculiar features from their size and their central situation in the communication between the Indian and Chinese seas, we have already considered them under the appellation of the Sunda islands. We now, in an order from east to west, take a view of the numerous islands forming the eastern part of this extended line. In geological structure they belong to that description of country which is called by geologists the secondary formation, being distinguished by the horizontal, or nearly horizontal, position of its strata, while Borneo and others to the north consist partly of primitive rocks, one leading character of which consists in a comparatively upright position of their strata. This distinction is accompanied with another important difference, that, while the primary strata contain tin and gold mines, these are wanting in the Timorian chain.

The most easterly islands of this chain are the Arroos,[a] which are very populous and very fertile. Their surface is low and covered with woods. They abound in all the fruits of the Moluccas. They contain poultry without number, the bird of paradise, and beautiful loris. Among their quadrupeds we find the kangaroo, which is there called the pilandoc.[bc]

To the west of these are the Keys already mentioned, fertile in cocoa, lemon, and orange trees, and pisangs, and containing a nation whose complexion and hair declare them to belong to the Malay race. Here each village has its chief, its temple, and its idol. The inhabitants sometimes dispute and war about their different rights of fishing. They immerse the bodies of the dead in oil, dry them before a fire, and keep them for some months before interment, a custom which reminds us of the islanders of Otaheite. Weak and badly armed, these people have always behaved with mildness and hospitality to Europeans. They carry on some trade with the Banda islands. Goats and hogs are their only quadrupeds.[d]

To the south-west of the Keys is the beautiful island of Timor-Laot,[e] which, with that of Laarat, forms a large bay ; also Baber, where the Dutch have a military station ; Duma,[f] where there are harbours and a volcano, but so unhealthy a climate that the Dutch were obliged to desert it ; Moa and Lati, which supply the Banda islands with excellent sheep.

The large island of Timor is better known. Its limestone mountains, composed of sea-shells at elevations of 800 feet, are covered with all sorts of trees and shrubs. At every turn of bay or promontory we are presented with some new prospect of a picturesque and romantic character.[g] The enthusiasm of navigators, who visited it immediately after leaving the tiresome shores of New Holland, has created some exaggeration in their descriptions of the fertility of this island. Yet it contains beautiful *eucalypti*,[h] and a species of pine which might be well adapted for masts.[i] The coffee tree has succeeded in it; cinnamon, perhaps also cloves, grow in the interior. The stony nature of the soil, and the irregularity of its surface from mountains and ravines, leave little space adapted to the cultivation of rice ; and, were it not for its bananas, its cocoa-trees, its jack trees, *eugenias*, and other fruit-bearing species, Timor could not maintain its scanty population. Its only exports are sandal wood, the salangan swallow's nests, and bees wax.[k] The bee is not domesticated here, nor, indeed, in any part of these islands or of Asia. The honey of this insect, in these equatorial regions, is inferior in flavour to that of higher latitudes ; and, as the plants are in flower during the whole year, the quantities which they lay up are comparatively small, so that the honey of Arabia is imported to the Indian islands as a luxury. But the vegetation supports an infinity of wild bees affording an abundant supply of wax, which is largely exported to Bengal and China. The largest supply is obtained from Timor and Floris.[l]

The water of the rivers is said to be deficient in salubrity.[m] The hot and dry season, which reigns from May to November, is succeeded by torrents of rain, accompanied by a violent north-west wind, lasting from November to March. The European visitor is liable to fevers of a fatal character, from the slightest irregularity in exposure to the air, the use of water, of baths, or of fruits. The inhabitants are very subject to cutaneous diseases, and to scurvy. Another disadvantage of this island, so highly praised by M. Peron, is the want of a safe and convenient harbour. The Dutch, who are masters of the south-western part of the island, possess there Fort Concordia, near an anchoring ground called Coopang, from a town of that name, very pleasantly situated in the midst of delightful orchards, which, with scarcely any culture, produce, all the year round, abundance of the most exquisite fruits, and exhale delicious odours. The mixed European race, the Chinese colonists, and Malays of this island, pass their time in voluptuous inactivity, devolving the cares and labours of life on their slaves.[n] The north-east side is subject to the Portuguese, who, after abandoning the Fort of Lifao, have now a fort at Didil, a place where there is an anchorage. The canton of Uikoessi, on the north coast, is possessed by a Portuguese colony, mixed with aboriginal natives.[o] The native chiefs of the whole of the south coast are independent, and reign over tribes of negroes similar to those who live in the interior of Borneo, and the other neighbouring islands. Despotism,

[a] "Arrou, Arrow," Aroo.
[b] Valentyn, p. 42.
[c] A different species from the kangaroo of New Holland. (Kanguroo d' Aroë, *Cuv.* Didelphis Brunii, Gmelin. Pelandor Aroë [Arroo rabbit] of the Malays.)—P.
[d] Dutch Report of 1624, quoted by Valentyn, in his account of Banda, p. 40.
[e] "Timor-laout," Timor-laut.
[f] Domma.
[g] Peron, Voyage aux Terres Australes, ch. 8.
[h] Leschenault de Latour, Annales des Voyages, t. XVI. p. 280.
[i] M. de Rosily, in a MS. Memoir read to the "Societé d'Emulation," of the Isle of France.
[k] Hogendorp's Account of Timor, translated from the Dutch, Annales des Voyages, t. VI. p. 281.
[l] Crawford's Hist. of the Indian Archipelago, vol. III. p. 438.
[m] "Particles of gold are found in the sands of the rivers."—M. B.
[n] Leschenault de Latour, Description de Coupang, Annales des Voyages, t. XVI. p. 287.
[o] Hogendorp, loc. cit. p. 279.

superstition, and voluptuousness, have generated in the Timorians the same character which prevails among the other islanders of these regions. Some of the rajahs call themselves the descendants of caïmans, or crocodiles, and seem to be every way worthy of that illustrious descent. It has been supposed that not less than forty languages are spoken among the rude and scattered population of this island.[a] This is a characteristic by which the Oceanian negroes are distinguished from the Malay or olive race. The former, never enjoying the advantages of union or extensive mutual communication, have possessed insulated languages and manners, while the latter exhibit, in these particulars, proofs of the ancient unity of their nation.

The island of Samao, on the south-west of Timor, rather barren, though covered with trees, affords a shelter to vessels driven from the anchorage of Coopang, during the north-west monsoon. The island of Kambing, situated between Samao and Timor, exhibits a curiosity in physical geography, in the bubbling up of sulphurous waters, like those in some parts of Italy.[bc] The island of Rotti, beyond Samao, is both larger and more fertile, and supplies the Dutch with rice and *jaggari*, or palm sugar. Cook says that the sugar cane grows here. The inhabitants, better made, and stronger than the Timorians, refuse both the government and the religion of Europeans; they are said to lead licentious lives, and to indulge in the most depraved inclinations. The inhabitants of the little island of Dao are all goldsmiths.

Savoo is the name of two small islands to the west of the preceding. They are very populous, yet export a large quantity of rice. Their astonishing fertility makes them productive under the most protracted droughts. The men pluck out their beards, and, in the figures with which their bodies are marked, preserve some traces of tattooing.[d]

The large island, called, from its produce, "Sandal-wood Island," in Dutch, Sandel-Bosch, has, in the Malay language, the name of Pulo Tchinnana, which has the same import.[e] But that valuable article is exported from it only in small quantity; some suppose that the natives are unwilling to cut down the trees, believing that they are the present abodes of the souls of their ancestors.[f] Cotton, buffaloes, horses, poultry, and pheasants, abound in this island, which is very steep on the south side. At present it is nearly independent of foreign influence. According to some late authors, the true name of the island is Sumba.

The chain of islands to the west of Timor is double. We have followed the southern links, and are now to take a survey of the northern, which are, in general, larger and closer together. Leaving the northern extremity of Timor, we count four islands in a westerly direction, called Omba, Pontar, Lombet,[g] and Sabrao;[h] but we know little more about them than their names. The last of them, Sabrao, is high, picturesque, and full of villages.[i] Solor island is much better known. The Dutch, who have a fort in it called Frederic-Henry, think well of the courage of the Solorians as seamen, and keep a number of them in their employment. The whale fishery furnishes these islanders with oil and ambergris; articles which, together with bees wax, form their principal exports.[k]

The island of Floris,[l] or of Ende, is nearly as large as Timor; but, as the only European establishment on it, that of Larantooka, belongs to the Portuguese, our knowledge of it is but slender. It is subject to earthquakes. The Macassars come to it for slaves, oil of cocoa, tortoise shell, wood, and wild cinnamon, though this last is prohibited by the Dutch.[m] In this island, as in Timor, there is a great multiplicity of local languages.

The large island situated to the west of Floris, and separated from it by the strait of Sapy, takes indifferently the name of Bima, or Sumbawa. These are properly the names of two different kingdoms, into which it is divided, one at the east, and the other at the west end. The Portuguese call it Combava.[n] All the princes of the island, six in number, have in one confederate body concluded a treaty with the Dutch Company, by which the latter has the exclusive right of trade; but the treaty is not rigorously enforced. The exports are rice, *cadjang*, or ground pistachio nuts, sapan wood,[o] wax, and horses.[p] Mr. Crawford remarks, that, though the size of this island is considerable, there are only five languages in it. As we proceed westward, civilization is more advanced, and the languages fewer in number. In the civilized portion of Celebes, there are not more than four; six in Sumatra; and only two in Java.[q] Sumbawa is a pretty large town. The kingdom of this name formerly included the island of Lombok, now connected with Bali. Its true name is Salanparang. It is rich in sapan wood.

We have now made the interesting tour of the Moluccas, or Spice Islands, in the largest acceptation of the term, returning to the island of Bali, which was described under the head of the Sunda Islands, being a dependence of Java. We have some remarks to make on the Molucca sea. Like all those parts of the ocean which are under and near the equator, it is full of zoophytes, contains many coral reefs, and is subject to permanent and periodic winds.[r] It resembles the neighbouring seas in containing a great number of volcanoes, which occasionally produce changes in the form of its bed. One phenomenon peculiar to this sea, is the periodical appearance of a current of opake white water, like milk, which in June, and in August and September, covers the surface of the basin in which the Banda Islands are situated. It is first seen about the Keys and Timor-Laot, then extends north to the shores

[a] Crawford's Hist. of the Indian Archipelago, vol. II. p. 79.
[b] "Ebullitions of sulphureous waters, similar to the *salses* of Italy."—M. B.
[c] Hogendorp, loc. cit. p. 322.
[d] Cook's First Voyage, book III. ch. 9.
[e] Valentyn's Map of the Islands of Timor, &c.
[f] Hogendorp's Account of Timor, loc. cit. p. 322.
[g] "Lombatta," Lomblem.
[h] "Serbite"
[i] Valentyn, Banda, p. 120.
[k] Hogendorp, loc. cit. p. 320.
[l] Flores.
[m] Radermacher, Descript. de Celebes, p. 232.
[n] Cumbava.—M. B.
[o] Radermacher, Celebes, p. 253—256.
[p] Valentyn, Macassar, p. 141. (vol. IV.)
[q] Crawford's Hist. of the Indian Archipelago, vol. II. p. 80.
[r] "Aux vents périodiques et constans," i. e. monsoons and trade winds.—P.

of Amboyna and Ceram, and west to those of Timor and Omba, losing itself between Floris and Celebes. During the night it is somewhat luminous, which makes the eye confound it with the horizon. It is dangerous for vessels, for the sea seems to undergo an inward boiling agitation, wherever it passes. During its prevalence the fish disappear.[a] This white water seems to come from the shores of New Guinea and the Gulf of Carpentaria.

[a] Valentyn, Banda.

Table of Geographical Positions in North-western Oceanica; or the Sunda, Philippine, and Molucca islands.

PLACES.	Latitude	Long. East from Lond.	AUTHORITIES.
SUMATRA.	deg. min. sec.	deg. min. sec.	
Achcen	5 22 0 N.	95 41 15	Mannevillette.
Bencoolen	13 49 16 S.	102 10 45	Connaiss. des Tems.
Fort of Palembang	2 40 0 S.	103 23 15	Batavian Memoirs.
Nassau islands, northern point	2 18 0 S.		Crisp. Asiatic Researches.
Do. southern point	3 16 0 S.		Idem.
Island of Lucipara (in Banca Strait)	3 10 45 S.	106 17 45	Mannevillette.
Mount Monopin (in Banca Island)	2 3 0 S.	105 22 45	Idem.
Gaspar Island (in the strait between Banca and Billiton)	2 21 0 S.	107 5 15	Marchand. Fleurieu.
JAVA.			
Prince's Island (in Sunda Strait)	6 36 15 S.	105 15 15	Mannevillette.
Island of Cracatoa (ibid)	6 6 0	105 36 15	Idem.
Batavia	6 10 33 S.	107 7 45	Batavian Memoirs.
Batavia	6 12 0 S.	106 54 1	Connaiss. des Tems.
Surabaya	7 14 23 S.	112 41 28	Rossel.
BORNEO.			
Banjermassing	2 40 0 S.		Batavian Memoirs.
Island of Balambangan	7 30 0 N.	117 5 15	Dalrymple.
PHILIPPINES.			
Manilla	14 36 8 N.	120 52 15	Connaiss. des Tems.
Cape St. Augustine	6 12 0 N.	126 10 15	Idem.
Sooloo Island	5 56 0 N.	121 2 15	Dalrymple.
MOLUCCAS.			
Fort Victoria (Amboyna)	3 41 41 S.	128 7 20	Rossel.
Cayeli (Booro)	3 22 33 S.	127 2 49	Connaiss des Tems.
Timor, north point	8 28 0 S.	125 22 15	Rossel.
Ibid. Fort Lefas[a]	9 12 15 S.	124 15 15	Idem.
Salayer island	5 45 0 S.	120 25 15	Idem.

[a] Lifao, p. 597.

BOOK LVI.

OCEANICA.

PART IV.

New Holland and its Dependencies.

From the archipelago of north-western Oceanica, where the Moluccas raise their spicy heads, we proceed by a short interval to the Great Oceanic land, which the Dutch navigators have named New Holland. These were the first who procured for us any distinct knowledge of it, though the Portuguese and Spaniards had landed on its shores a century before. In no part has this immense island presented any aqueous opening by which the interior can be explored by navigators; no deep creeks, or large navigable rivers. Hence all our geograpical knowledge of this extensive country reduces itself to a series of observations on its coasts, and even these labour under interruptions.

New South Wales, or the east coast of New Holland, begins at Cape York, the point at which it comes nearest to New Guinea, in 10½° of south latitude, and ends at Hickes's point,[a] about 38 degrees of south latitude; so that this coast is 1870 miles[b] in length. The claims of the English have no fixed boundaries; they seem desirous to confound the whole of New Holland under the modern name which they have given to the east coast, which was minutely explored by Captain Cook. It is worthy of remark, however, that the French geographers had, from a comparison of the tracks navigated by Abel Tasman, previously concluded on the existence and direction of this coast itself.

A chain of mountains seems to run in a direction parallel to this coast, at a distance of from 50 to 80 miles.[c] It is only of late that a passage has any where been found across that chain. The coast itself is high, but not mountainous; and is partly shaded by trees of gigantic size. Towards the south-east, a great part of it is covered with coppice: much also is occupied with marshes. About Botany Bay the soil is black, rich, and exceedingly productive in plants: from this last circumstance it has obtained the name which it bears. The north-east part seems lower. The coast is covered with mangroves, and skirted by an immense line of reefs, rocks, and islets: but in every part of it a mountain chain, lying north and south, bounds the horizon; and, though it is lower than the limit of perpetual snow, its numerous terraces, resembling those of the Allegheny Mountains, and Mount Atlas, long proved insurmountable to the keen and enterprising curiosity of Europeans. In the neighbourhood of Port Jackson, the first terraces begin at a distance of ten or twenty miles from the coast. Several expeditions, undertaken for the purpose of crossing the chain, proved unsuccessful.[d] Wilson proceeded 140 miles in a south-west direction, along an extensive table land, and broad valleys.[e] A passage was, however, at last discovered in 1814, and a road is now opened from Port Jackson of a tolerably easy ascent; but the descent from the summit of the ridge to the westward is steep and rugged. Beyond these hills a large extent of arable and habitable country has been discovered; and some large rivers, which, so far as has been hitherto found, seem to terminate in one or more extensive morasses.[f] The elevation of Mount York, the highest point in this quarter, above the level of the sea, is only 3200 feet.[g] Their breadth is fifty-eight miles.[h]

These mountains are very rocky; but granite, the characteristic of primitive mountains, has not been found as one of their constituents. They consist chiefly of sand-stone and quartz; but in the flat country, to the west of the mountains, granite makes its appearance, and is the only sort of stone to be met with for 200 miles. Limestone is found in some parts, and Wilson saw an enormous block of rock salt. The promontories are in several places faced with columns of basalt. In Howe's Island these are high enough to be seen at a distance of thirty-three miles.[i] The specimens of granite, mica, and rock crystal, which have been brought from New Holland by M. Bailly, and deposited in the collection of the Council of the Mines at Paris, are similar to those of Europe. None of the precious metals have hitherto been seen; but strata of a more useful mineral, coal, have been found to the north of Port Jackson, at a place called, from that circumstance, Newcastle.

None of the rivers discovered on this coast have the appearance of a long course. Near Glasshouse Bay, Captain Flinders found the mouth of a wide river.[k] Endeavour river, farther to the north, is quite insignificant. Hawkesbury river waters, and sometimes inun-

[a] Properly at Wilson's promontory, farther south.—P.
[b] "675 French leagues."
[c] "20 to 30 French leagues."
[d] Péron, Voyage aux Terres Australes, I. 390.
[e] Collins's Account, &c. vol. II. p. 89.
[f] The English have extended their researches to 144° E. long.—P.
[g] Wentworth's Description of New South Wales, 2d edition, p. 82.
[h] A party which recently crossed from Sydney to Western Port, found the mountains in that direction impassable by wagons. A chain called the S. Australian Alps begins at 34° 30′ S., 147° 50′ E. and terminates at Wilson's promontory. It was covered with snow in November. They crossed the following rivers, flowing westerly from this range, viz.: Hume river, 36° 15′, Owen river, 36° 30′, and Goulburn river, 36° 50′. Grant river flows into the head of Western Port from the Snowy Mountains.—P.
[i] "12 French leagues."
[k] Collins, vol. II. p. 247.

dates, the English colony. Beyond the Blue Mountains two rivers have been found; one called Lachlan river, running a little to the south of west, which was followed by Mr. Oxley in 1817 as far as 500 miles west from Sydney, and within 150 of Cape Bernouilli, on the west coast; and another, called Macquarrie river, which has been followed to 30° 11′ of south latitude, and 147° 10′ of east longitude. Both are found to terminate in marshes or shallow lakes. It is most probable that they never reach the sea, and that ultimately their water is entirely dissipated by evaporation from an extended surface, consisting partly of a lake and partly of a morass. Some of the natives previously gave an account of an immense inland lake, the borders of which were inhabited by white men; but that account was pure fabrication. The country has been found uninhabited; and, from the wildness and inutility of its vegetation at a certain distance from the mountains, and its evident liability to extensive inundations, is uninhabitable. In a westerly direction from these terminations of the rivers, no elevated grounds have been seen by the expeditions of discovery, so that the nature of the country beyond the humid flats remains unknown.[a]

Lying to the south of the equator, New Holland has seasons corresponding to those of the south of Africa and America, being the reverse of those of Europe; its summer corresponds to our winter, and its spring to our autumn. The heat of December rises to 112° of Fahrenheit. The forests and the grass have been known spontaneously to take fire.[b] The north-west wind, like the *khamseen* of Egypt, scorches the soil, and reduces it to a light dust.[c] Violent rains often fall on the Blue Mountains, cause a sudden rise of the rivers, and their waters, prodigiously augmented, deposit a fertilizing mud.[d] The crops have sometimes been devastated by hail of enormous size; some stones are said to have been found eight inches long. Notwithstanding these disadvantages, the climate is very healthy, and very favourable to population.[e]

The vegetation of New South Wales presents two species of gum-trees, the *Eucalyptus resinifera*, and the *Xanthorrhœa*, which are characteristic of the whole of New Holland. Mahogany is exported from it, and large trees have been discovered, resembling pines and oaks. Some of the wood of the forests is said to be too brittle for the purposes of carpentry.[f] Perhaps the interior may display a vegetation different from that of the coasts. Nature has been sparing of indigenous alimentary plants in this country. Some bad gramineous species,[g] arum roots, the sago palm, the cabbage palm, and a species of wild pisang, are the only native vegetables that furnish food for man. The *Eucalyptus piperita* produces an oil which is found a good remedy in cholic.[h] Wheat, maize, oats, and rye, are all cultivated, the two former in largest quantity. Those parts in which different trials have been made have rather too warm a climate for common barley and oats, though these grains have been found to succeed tolerably well on the poorer soils. The skinless barley, or Siberian wheat, arrives at great perfection.[i] Potatoes, cabbages, carrots, parsnips, turnips, pease, beans, onions, and all the vegetables grown in England, are produced in the English colony. The same locality is now famed for the goodness and variety of its fruits; peaches, apricots, nectarines, oranges, lemons, guavas, loquets, cherries, walnuts, almonds, grapes, pears, pomegranates, and melons, attain the highest maturity in the open air; and the pine-apple may be reared with a common forcing glass. The peach is the most abundant, and the most useful of the fruits. It is given, as in America, for feeding the hogs, and is fermented into cyder.[k] From the great extent of terrestrial latitude through which this country passes, we must conclude that those parts which lie nearer the tropic and the equator are capable of yielding products suited to the torrid zone, as soon as fair experiments are made; and that those, on the contrary, which have a higher southern latitude, will exhibit the vegetation of colder countries. Accordingly the island of Van Diemen has been found to produce apples, gooseberries, and some other fruits, in greater perfection than the colonial settlement of Port Jackson.

Of the quadrupeds of New South Wales, the largest is the kangaroo, which is sometimes six feet long, and can kill a dog with a stroke of its tail. Some of them have a degree of elegance in their form.[l] There is also the kangaroo-rat, or *potoroo*, which is no larger than a common rat. The phascolomys, a species of opossum, called the wombat by the natives, has some points of resemblance to the bear.[m] These animals, with the flying squirrel,[n] and some others, are examples of the tendency of the quadruped races of this country to the nature of the didelphis, or opossum, by having a pouch under the belly. The *tachyglossus*[o] resembles the African hedge-hog in figure, and the American ant-eater in its habits. It is not certain whether any wolves are found in this country. The native dogs are a sort of wolves, or jackals; they do not bark; some of them are very handsome, but they are not tameable, and are destructive to flocks.

The *ornithorhynchus* of this country is a singular animal, nature having in its structure departed from her usual laws. It is a quadruped with its jaw prolonged so as to form a bill like that of a duck, and its feet webbed like those of that bird. No appearance or breasts has been found in the female, which makes it probable that it is oviparous. In its internal structure it has some characters approaching to those of the shark and the reptile tribes, whose eggs are hatched within the body of the parent. Externally viewed, it

[a] Wentworth's Description of New South Wales, p. 88—123. (2d edition.)
[b] Collins, II. p. 72—199. I. 153.
[c] Péron, tome I. p. 418.
[d] Collins, II. p. 199, &c.
[e] Hunter on the Origin, &c. p. 375.
[f] "But the timber of the forests is brittle and of little value."—M. B.
[g] "Quelques joncs de mauvaise espece." Some worthless rushes.
[h] White's Voyage to New South Wales, p. 226
[i] Wentworth, p. 124—126.
[k] Wentworth, p. 127—129.
[l] Péron, Atlas, tab. XXVII.
[m] The author, in the original, distinguishes the phascolomys and the wombat. Cuvier applies the native term wombat to the genus phascalomys, but Geoffroy to a distinct genus, which he has called wombatus.—P
[n] White's Voyage, p. 288. Zimmerman, Australien, I. 891.
[o] Echidna, Cuvier. Porcupine ant-eater.—P.

has the appearance of an intermediate link between the seal and the class of birds. It is about sixteen inches long,[a] and lives in fresh water lakes.

Birds are exceedingly abundant, and of numerous species. Among those which resemble the birds of Asia, are the brown eagle, several kinds of falcons, many beautiful paroquets, ravens, crows, and a large species of king-fisher; there are also bustards, partridges, and pigeons. This country has birds peculiar to itself. The largest of them is a new species of cassowary called the emu, which we are told is seven feet long, and its flesh tastes like beef. It is intermediate in character between the cassowary of the Moluccas and the American toucan.[b,c] The *Mœnura superba* is as remarkable for beauty as the cassowary is for size. This bird has much the air of the pheasant and the peacock, with a tail formed like a lyre, glittering with orange and silver white.[d] Among aquatic birds are found the heron, a kind of *ibis* or curlew, and pelicans of gigantic size. There are also some peculiar species of the duck and swan kind. The black swan is an uncommon production of this continent. In size it exceeds the common white swan. Its beak is a rich scarlet, with a yellow point. All its plumage is of a very beautiful black, except the primary and secondary feathers, which are white. The eyes are black, and the feet dark brown. It is found on the Hawkesbury river, and other fresh waters near Broken Bay. In its motions it has all the gracefulness of the white species. This bird was first discovered by the Dutch navigator, Vlaming, on the banks of Swan river, in Endracht's Land.[e]

Green turtles abound about Norfolk island and Howe's island. They also make their appearance on the coast of New Holland. There are a great many lizards and serpents. The blue crab is an animal of uncommon beauty. The butterflies are splendidly diversified.

Among the cetaceous tribes are dolphins and porpoises. There is also a singular fish which, when left uncovered by the ebbing of the sea, leaps about like a frog by means of strong fins.[f] Thus in these regions we find that while nature has confounded birds with quadrupeds, she has in some measure allowed the fish to take possession of the land. The instincts of animals seem to have a more extensive range in proportion to the degradation of the human intellect in the same regions. The activity of the inferior creation presents a curious contrast to human indolence and indifference.[g]

New South Wales seems to offer at least three native varieties of inhabitants, all belonging to the race of Oceanian negroes. In the neighbourhood of Glass-house Bay, the savages have large heads, which in shape resemble those of the ourang-outang. Their very limited intellects, their hairy bodies, and habitual agility in climbing trees, seem to bring them near the monkey character.[h] To the south-west of the English colony, tribes have been found which speak a distinct language, and have hardier constitutions than those in the immediate vicinity of that colony. The latter are the only race that is well known to us. Perhaps no people in the world has made less progress towards civilization. They are simply divided into families or tribes, each of which is distinguished by adding the syllable *gal* to the name of its place of residence. The south shore of Botany Bay is called *Gwea*, and the tribe that lives on it *Gwea-gal*. The features of the women are not altogether unpleasant. A black thick beard, and pieces of bone stuck in the cartilages of the nose, give the men a disgusting appearance, and the fetid odour of their bodies, from the fish-oil with which they habitually anoint themselves, to obviate the supposed noxious agency of the air, and the bites of musquitoes. They paint themselves with white or red figures. The women are distinguished by the want of two joints of the little finger of the left hand. This practice of amputation, together with that of extracting one or two teeth of the boys at an early period, are thought by some[i] to be intended for the purpose of inuring them to suffer pain with fortitude. Their eye-sight is uncommonly acute. Some of them are almost as black in complexion as the African negroes; others are copper-coloured: their hair is generally long, and not woolly like that of the Africans. There must, however, be exceptions to this rule, if the print of a native, called *Cobawn Wogy*, given by Mr. Dixon, is correct, which we have no reason to doubt.[k] They have flattened or aquiline noses, wide nostrils, hollow eyes, thick eyebrows, thick lips, larger mouths than any other people, and white regular teeth. Their arms, legs, and thighs, are extremely lean, probably in consequence of the indifferent quality of their diet. Those on the sea-coast live on fish: a few live in the woods on such animals as they can catch, and climb the trees to eat the honey contained in them, or to catch flying squirrels and opossums.[l] Their huts are rudely constructed of the bark of trees, in the shape of kilns. The fire is placed at the entrance, and the interior is full of smoke and dirt. There they sleep promiscuously, in so far as their hostilities and frequent assassinations will allow. It is only in the fabrication and use of their weapons that we perceive any proofs of intelligence. With the aid of a wooden rest they throw their javelins with such dexterity as to be sometimes formidable to Europeans. They kill fish with a kind of fork. The women also fish with lines made of the inner bark of some trees, and hooks made of the shell of the pearl oyster, filed to the requisite form with a stone. Some of them catch kangaroos in snares. Caterpillars and worms also constitute part of their food. Their canoes are made of the bark of trees, fixed on wooden frames. Nothing can equal the

[a] Blumenbach, Abbildung naturhist, gegenstænde, cah. 5. No. 41.
[b] Zimmerman, Australien, p. 884.
[c] Not the ramphastos or large-billed toucan, to which it has no affinity, but the rhea or American ostrich, which was called touyon by Buffon.—P.
[d] Collins, II. p. 87.
[e] Valentyn, Description de Banda, vol. IV.
[f] G. Forster's Opuscula, p. 255. (German.)
[g] "Probably the instincts of animals have no where had a freer opportunity for developement. Man, degraded to the lowest scale of human existence, has not been able to restrain the industry of the lower animals, here much superior to his own."—M. B.—P.
[h] Collins, I. 554.
[i] By the author.
[k] Narrative of a Voyage to New South Wales, Edinburgh, 1822. See the frontispiece.
[l] Collins' Account of Botany Bay, *passim*.

brutality of these tribes in their treatment of the weaker sex. In order to obtain a woman in marriage, a man lies in wait for her in some place of retreat, knocks her down with a bludgeon or wooden sword; and, while she is yet besmeared with blood, takes her to his own home, where the nuptial ceremony is completed in a manner too shocking to be described. Polygamy is very generally practised. Both sexes go naked, and have no feelings of shame. One tribe, which is strong and numerous, maintains the singular privilege of extracting a tooth from the youths belonging to other tribes; this being the only mark of superiority on the one side, and homage on the other. This tribute of teeth is exacted every four years, and is represented, in a number of engravings published by Mr. Collins, as a singular feature of savage life. In some parts of this ceremony we see the figure and character of man degraded by being placed on all four, and furnished with an artificial tail, as if the dog or the kangaroo were his superior. In other parts, the custom now mentioned seems to be a sort of initiation to physical pain and the hardships of war.[a] They have very faint notions of a future state, believing that at death they shall either roam through the regions of the air like cockatoos, or return to the clouds from which they originally came—a strange notion, common to them with the Alfoors in the island of Ceram. These poor savages are also enslaved by superstition; believing in magic, sorcery, and ghosts. The latter may probably owe their rise to the disturbed sleep and the habitual terrors of their miserable lives. They employ charms against thunder and lightning; and pretend to foresee future events by the meteors called falling stars. When children die, they bury them; but the bodies of warriors who are past the meridian of life are burned: and their graves are distinguished by rude monuments. If a woman dies while suckling an infant, the latter is buried alive in its mother's grave.[b] Yet these barbarians are seen crying over the grave of a child or a friend. Their eyes, humanized by the tears of affection, are then turned up to heaven. They show some respect for old men, and do not labour under that irresistible propensity to theft which characterizes the islanders of Polynesia. Mr. Collins has given us a short vocabulary of their language. It is bold, harmonious, and expressive, and has no resemblance to any other known language. But in different parts of the country, the languages seem to differ as much from one another as from those of the rest of the world.

England has long been in the practice of disposing of her bad subjects in a manner both philanthropic and politic, by transporting them to certain distant countries which they employ them in cultivating and peopling. It was in this manner that the banks of the Potomack and Delaware first received a civilized population.[c] On the conclusion of the American war, there was some hesitation in the choice of a country to which criminals should be sent, who had received a sentence of banishment. Sir Home Popham was first employed in examining for this purpose the coast of Caffraria, between Negro Cape and the Cape of Good Hope: but, on the representations of Sir Joseph Banks, New South Wales obtained the preference. Here the first vessel, laden with colonists, arrived on the 20th of January, 1788. The first place of settlement was Botany Bay; but, this not having answered the expectations formed, Governor Philips determined on removing the colony to a place twelve miles to the north, called Port Jackson, containing one of the finest harbours in the world, about twelve miles long, with numerous creeks and bays.

Sydney,[d] the capital and seat of government of this remarkable colony, is in 33° 55′ of south latitude, and 151° 25′ of east longitude, about seven miles from the entrance of the bay called the heads of Port Jackson. It stands principally on two necks of land, along which the water is in general of sufficient depth to allow vessels of the largest burden to approach to the sides of the rocks. In the first instance all the houses were built according to the wishes of individuals, without any plan, so that the older part of it, called "The Rocks," is quite irregular. But by the arrangements of Governor Macquarrie, a perfect regularity has been established in most of the streets. It contains about 7000 inhabitants, but is diffused over a proportionably large space. The houses are in general small, and each has a garden adjoining to it. It contains many public buildings, and a few elegant private houses, built by successful traders, which give it the character of a rising metropolis. The market, which is held three days in the week, is well supplied with a variety of provisions. It has a bank with a capital of 20,000*l.*, which is allowed eight per cent. on money lent in discounting bills. It has one of those valuable institutions of recent invention, called "saving banks," which so happily promote a provident spirit among the labouring classes. There are two gratuitous schools, one for boys and another for girls, at which 224 children are at present educated; and some other institutions particularly directed to the dissemination of religious instruction. In this place, and in other parts of the colony, there are excellent academies for the education of the children of people in good circumstances. A weekly newspaper has been printed here almost from its first establishment.

At the head of the harbour of Port Jackson, fifteen miles from Sydney, is another town called Paramatta, to which the river, for the last eight miles, is only navigable for boats of fifteen tons burden. This town consists chiefly of one street, a mile long. Though inferior to Sydney in the style of buildings, it contains some good ones, which, with the church, the government house, the new orphan house, and some villas, give it a respectable appearance. The population is estimated at 1200. Two annual fairs are held here. It contains some excellent public institutions, one of the most interesting of which is a school for the education and civilization of the aborigines of the country, founded five years ago. It has produced some pleasing and promising effects, and the children discover not the least deficiency in mental capacity.

Further from the sea, and about thirty-five miles from

[a] Collins, vol. I. p. 567—581. [b] Ibid. vol. 1. p 607.
[c] This is not strictly correct. Many convicts were sent to Virginia, but not to Pennsylvania.—P.

[d] See Mr. Wentworth's interesting account of the Topography of this Colony.

Sydney, is the town of Windsor, situated on one of the tributaries of the large navigable river Hawkesbury, which falls into the sea at Broken Bay, to the north of Port Jackson. It stands on a hill about 100 feet above the level of the sea. The buildings here, as at Paramatta, are, in general, weather-boarded without, and lathed and plastered within. It contains a church, a government house, hospital, barracks, court-house, storehouse, and jail. It contains a more splendid inn than any other in the colony. Its population is about 600 souls, consisting chiefly of settlers, who have farms in the neighbourhood, with a few inferior traders and mechanics.

Windsor is situated at the confluence of the South Creek river with the Hawkesbury. The course of the latter (which, higher up, is called the Nepean) forms a sort of semicircular sweep, rising forty miles to the south of Sydney, about ten or twelve miles from the coast, proceeding northerly, as well as inland and westerly, then turning east and falling into the sea at Broken Bay, nearly as far to the north as its rise is to the south of the capital. It is navigable for vessels of 100 tons for about four miles above Windsor; which is 140 miles by water from its mouth, though only thirty-five in a straight line by land. The Hawkesbury is remarkable for its inundations, which occur, not annually, but occasionally. There have been four within the last two years. In the preceding six there had not been one. In these inundations, cattle, crops, and men, are swept away in indiscriminate devastation. They arise from the rains which fall among the Blue Mountains, promoted by the slow current of the river, but not increased by any confinement in the situation of the low country; for, after the banks of the river are filled, the water spreads over plains too extensive for the eye to reach. Such occurrences, when they happen, occasion a great destruction of produce; but on the latest occasion of this kind the scarcity was considerably relieved by a large importation of grain from the more recent colony of Van Diemen's Island.

The town of Liverpool is about eighteen miles west, and a little south from Sydney, on St. George's river; which flows into Botany Bay, and is navigable for boats of twenty tons burden as high up as the town. This town is only of eight years standing. The surrounding land is indifferent, but to the south there are some remarkably fertile districts; and Liverpool is likely to derive a degree of prosperity from its central situation, between these districts and Sydney.

This colony has its regular establishment of courts, for the administration of civil and criminal justice. The roads, which have been formed between the different towns by the direction of the governors, especially by Governor Macquarrie, have been admired for their goodness and great extent, particularly one leading across the Blue Mountains to a new station called Bathurst, on the west side of that range, which is 180 miles from Sydney. The climate of this colony has been found, on the whole, agreeable and salubrious. Pulmonary consumption and dysentery are the prevailing diseases. Hitherto we have heard of no such fatal epidemic fevers as are so frequent in some other colonies situated in warm climates. The small pox was introduced among the natives by Captain Cook's crews, and committed dreadful devastation; the descriptions of which are still handed down in simple songs, among the descendants of the sufferers. The soil is found to vary greatly in fertility, being most barren, in general in the immediate neighbourhood of the shore, and more fertile at a distance of ten or twenty miles. The banks of the rivers, in some places, yield exuberant crops. On those of the Nepean, an acre of land has been known to produce, in one year, fifty bushels of wheat, and a hundred of maize.

About sixty miles to the northward of Port Jackson is the town of Newcastle, at the mouth of the Coal river. Its population is 550 souls; all of whom, except about thirty free settlers and fifty troops, are incorrigible offenders, who have been convicted in the colony, and re-transported to this place; where they are worked in chains, in the burning of lime and the procuring of coal and timber. These articles are partly used in carrying on the public works at Port Jackson, and partly sold by government for the use of the colonists. The coal mines are considerably elevated above the level of the sea; the strata are visible on the face of the cliffs; very rich, and as easily worked as can well be imagined. The lime is made by calcining oyster shells, which are found in large heaps in the same neighbourhood, five or six feet above the level of the sea. Cedar and rose-wood are the chief species cut down, and have been removed in such quantities that they cannot now be obtained without going 150 miles or more up the river. The harbour is tolerably good, and receives vessels of 300 tons. A certain way up this river, it is thought probable that the summer heats are sufficient for the production of cotton, an article which would greatly add to the opulence of the colony. The fertility of the land round the harbour is superior to that of Port Jackson; and it will probably, by its varied advantages, attract a rapid accession of settlers.

The attention of the colony has been directed to a situation still farther north than the coal river, and to which the name of Port Macquarrie has been given by Mr. Oxley, whose expedition of inland discovery took this direction after having traced the Macquarrie river beyond the Blue Mountains as far as possible. Port Macquarrie is situated between the points called "Smoky Point" and "The Three Brothers," in south latitude 31° 23′ 30″. It had been seen by Captain Flinders. Mr. Oxley, however, discovered that it had a navigable entrance, and that the adjoining country is fine and fertile. From its latitude sanguine expectations are entertained that some of the productions of warm climates will succeed in this place, and that a reciprocal interchange of commodities may arise between it and the settlements of the more southerly and temperate climates, conducive to the prosperity of both.[a]

We have already taken some notice of the more inland parts in the latitudes of the British colonies, as the only specimen yet known to us of the interior of this singular continent. The first known pass leading over these mountains, which was discovered in 1814, is narrow, and at one place has a steep descent towards the interior. A more easy communication between these

[a] In Nov. 1824, 90 English colonists settled in Melville Island, N. of New Holland, in 11° S. lat.—P.

new regions and the first settlements was, in 1819, discovered by an expedition of fifteen days, executed by a large stock-holder of the name of Throsby. It is to the south of the one first discovered, and runs through lands of the best description. For an extent of 200 miles beyond the mountains the country abounds with rich herbage, and is well supplied with running water. As long as the rivers Lachlan and Macquarrie run nearly parallel to the mountain range, the one southerly and the other northerly, they are fed by a profusion of rivulets; but when they begin to take a westerly course, a want of water is perceptible, and increases with the distance. The country is, in general, free from underwood, and in many places has no timber at all. Bathurst plains, where there is a military depôt, contains 60,000 acres on which there is scarcely a tree. The extensive tract of country thus discovered is less adapted for increasing population than the easterly territory, in consequence of the distance and comparative difficulties of the communication between it and countries already peopled; but its herbage is sweeter and more nutritive for live stock; and its remote situation adapts it, in the meantime, to an unlimited extension of the speculations of the grazier.

From the materials of which the population of this whole colony was originally composed, it could not be expected to be, in the first instance, virtuous and orderly. Yet it is pleasing to find that several individuals who had been transported for the gross offensiveness of their actions in Europe, have betaken themselves to a virtuous industry; have maintained the most respectable conduct; and earned the reward of their ameliorated lives, in the acquirement of a comfortable, and even an opulent establishment. The prospects of success which the country affords, have also attracted free persons from Great Britain, who, of course, are justly viewed as, in the first instance, more to be depended on than convicts. Yet it is to be regretted that too many of these have, by their ungenerous principles, and their systematic and unbending aversion to the society of any quondam convict, however meritorious, created more mischief, in the form of division and discord, than can be compensated by the example of all their virtues. This evil can only be counteracted by new judicious combinations, for the express purpose of enabling all the varieties of the population to maintain some cordial intercourse, guarded by regulations, directed to the prevention of all the bad consequences of hazardous communications. A generous forgetfulness of faults, extended by one individual to another, is liable to be abused. But where no forgetfulness is understood to be implied, and no romantic confidence displayed, yet the system of distance not suffered to be carried beyond the bounds necessary to secure the future good habits of all concerned, methods the most conciliating and friendly might be openly followed, which would exhibit points worthy of the approbation and imitation of other communities, which are conceived to be more happily constituted, only because those who describe them have not turned their attention to the gall and the wormwood which enter their composition. We have been informed that some individuals, otherwise respectable, have declined to sit in a court of justice with any one who had been forcibly transported. Legislative enactments, tending to counteract such fastidious steps, might be conceived; but novel legislation is always a delicate task, and, unless adapted to circumstances with a masterly hand, and administered with an enlightened and refined policy, might be productive of extensive unforeseen mischief.—A large portion of the convicts, however, give little evidence of reformation in their principles and lives.

Agriculture, and the other useful arts, have made considerable progress since the first establishment of the colony. The poverty of the earliest settlers, and the want of general resources, made the hoe husbandry necessary, but the plough is now almost universally introduced in agriculture. Several of the convicts work in mechanical arts to which they had been originally educated, and thus contribute to the conveniences of life. Some individuals have embarked considerable capital in various manufactures, such as woollen cloths, hats, earthenware, salt, candles, soap, breweries, tanneries, and establishments of carpenters, blacksmiths, tinmen, rope-makers, and other artificers. Mr. Wentworth supposes the whole capital invested in the colonial manufactories to be nearly 50,000*l*. Considerable trade and income are derived from the following various sources:

Expended by government,[a]	£80,000
Ditto by foreign shipping,	6,000
Brought annually by emigrants and convicts,	30,000
Articles of export, collected from the adjacent seas and shores; as seal-skins, fish oil, and sandal-wood,	15,000
Produce exported to Africa, India, and north-western Oceanica,	10,000
Wool grown in the colony,	10,000
Other sundries,	6,000
	£157,000

The government collects, from various taxations, a revenue of 21,180*l*.[b]

From Port Jackson the direction of the coast is south, as far as Cape Howe, where it turns to the south-west. The country, consisting of extensive plains, terminates in Wilson's promontory, which is the southern extremity of the whole continent.

The large Island of Van Diemen, which it will be convenient to describe in this place, is separated from New South Wales by a channel called Bass's Strait, which is 100 miles[c] broad, and contains a great many small islands. It is situated between the parallels of 40° and 44° of south latitude, and between 145° and 149° of east longitude. It was discovered in 1644 by Tasman, who named it Van Diemen's land, in honour of the Dutch governor-general in the East Indies. It was considered as a part of the mainland of New Holland

[a] Wentworth's Account of New South Wales.

[b] The population of the colony in 1821 was as follows:

Voluntary emigrants and liberated convicts,	23,254
Convicts not liberated,	13,814
Total	37,068

700,000 acres had been appropriated. There were 120,000 head of cattle, and 350,000 sheep. In 1825 the population of Sydney was 7,000, of Paramatta 1,500, and of Windsor 900.—P.

[c] "30 French leagues."

till 1797, when Captain Flinders, then a lieutenant of the ship Reliance, and Mr. Bass, the surgeon, discovered Port Dalrymple on its north coast, circumnavigated the island, and, on returning to Sydney, represented it as a promising country for a new colonial settlement.

In 1803, the first English settlement was formed at Risdon, consisting of a few convicts from Port Jackson, and a small military and civil establishment.

In 1804, an establishment under Lieut. Colonel Collins was removed from Port Philip in Bass's Strait, on the south coast of New Holland, to the south of Van Diemen's island, to the very place where Hobart Town, the present capital, stands. About the year 1811 the dependency of Norfolk island was abandoned, and its inhabitants were chiefly removed to this island, part being settled on the Derwent, above Hobart Town, in a place hence called New Norfolk, and the remainder in a fine district in the north part of the island, called Norfolk Plains, near the village of Launceston, previously formed.

The aborigines of this island bear a great resemblance to those of Port Jackson, and other parts of New Holland; but their complexions are of a deeper black, and their hair more universally woolly. They are deficient in some of the arts practised by the former. They have no sort of canoes, and in moving across streams or narrow channels, merely make use of the rudest temporary rafts. Their spears are heavier and worse made; and, in throwing them, they make use of no wooden rest, like those of the continental tribes. Their huts, however, are much better formed. Their language is totally distinct from any one spoken on the continent. Their tempers are less ferocious, and their countenances more humane than those of the New Hollanders. They have shown themselves less disposed to entertain dread, distrust, and hostility to their European visitors, till a very lamentable occurrence converted their unsuspecting friendliness into well-founded terror, and implacable antipathy. A military officer, in the absence of the lieutenant-governor, took an alarm on the approach of a large party of them to the English settlement, though accompanied by the emblems of peace and friendship, and ordered his men to receive them with musket shot, by which a dreadful havock was produced. The bad opinion formed of the settlers in consequence of that event has been most probably confirmed by the lawless conduct of those runaway Englishmen, who, under the name of bush-rangers, lead the lives of plunderers amidst the extensive wilds of this new country. The women are better formed, of more agreeable aspect, and cleanlier in their habits, than those of New Holland. They do not, like them, practise the amputation of part of the little finger. Some of them have formed temporary intimacies with the sailors belonging to English vessels in the seal trade, who visit the east coast of the island, and some specimens of a mixed breed have been produced of a copper colour, said to be handsome, with rosy cheeks, and large black eyes, the whites of which are tinged with blue, good teeth, and well-formed limbs. Sometimes the natives have been found naked, sometimes clothed in kangaroo skins; the women have generally more or less covering.

The climate of this island has been found singularly salubrious for the European constitution. Neither the summers nor the winters are subject to great extremes of temperature. In the mountains the snow lies for the greater part of the year; but in the valleys never longer than a few hours. The mean temperature in the latter is about 60°, and the range from 36° to 80°.

This island contains several mountains of considerable elevation. The principal one is called the Table Mountain, situated immediately behind Hobart Town, and ascertained to be 3964 feet in height. Its immediate vicinity is liable to violent blasts, which seldom last more than three hours. Towards the western part of the island there is a range of high hills, called the Western Mountains, about 3500 feet in height. There is a great diversity of hills in other parts of the island, but none that can be called mountains.

The two principal rivers are the Derwent, running to the south, and the Tamar, running to the north. The banks of these two have attracted the earliest colonial settlements, in consequence of the convenience of their mouths, affording excellent harbours for shipping, and still more from the excellence of the soil along their banks. Their tributaries rise near one another in the centre of the island, and an easy communication is kept up in this direction through the interior, from the northern to the southern coast. To the east of the Derwent there is a river called the Coal River, which runs into a marine lake called Pitt Water. The river Tamar is of great importance, on account of the agricultural value of its banks, although towards the mouth the soil is sandy and barren. Port Dalrymple, at the mouth of this river, is beset with reefs and shallows, which render the entrance dangerous for vessels in foul weather. On the western side of the island, two rivers, supposed from their direction to proceed from a lake in the interior, flow into the head of a deep creek, called Macquarrie Harbour. Two others fall into an opening farther to the south, called Port Davey. A small river, called the Huon, runs from Table Mountain straight south, and empties itself into a creek at the mouth of the Derwent.

This island has numerous and extensive lakes. One which has been visited, on the top of the Western Mountains, is about fifty miles in circumference, and supposed to have several overflowing points, giving origin to rivers in different directions. There is one called Lemon's lake, besides several others in the central parts of the island.

The western, southern, and south-eastern coasts, are high and bold; but afford numerous bays, creeks, and harbours. The north coast is generally low and sandy. Derwent harbour is one of the best in the world. Macquarrie harbour is difficult of entrance, but when entered affords safe anchorage.

The natural trees of this island are nearly the same with those of New Holland. But no cedar, mahogany, or rose-wood, has been found here. There is a species of oak, called black-wood, which, with the Huon pine, serve as good substitutes for these useful trees. The Huon pine grows in great abundance on the rivers of Macquarrie harbour. The indigenous botany is, like that of New Holland, exceedingly scanty in articles fit for human sustenance. Labillardière describes ma

new plants, remarkable for the beauty and singularity of their flowers and foliage. The sands[a] produce a species of *plantago*, called *tricuspidata*, which is a good salad, and one of the most useful plants that this island furnishes. In the woods of the interior[b] a new species of *ficoides*[c] is found, the fruit of which is eaten by the natives. Those useful plants introduced by the British, which are adapted to the latitude of the country, grow in great luxuriance.

The best known wild animals of Van Diemen's island are the kangaroo, the emu, the opossum, the squirrel, the bandycoot, the kangaroo rat, and the opossum-hyæna. The native dog of New Holland is here unknown; yet the flocks of the settlers are not for that reason exempt from the attacks of beasts of prey, for there is a sort of panther which occasionally commits dreadful havock among them. It is an animal of considerable size, sometimes measuring six feet between the mouth and the end of the tail; but it is of a cowardly nature, and invariably flies from the approach of man. Among the numerous birds of these regions there is one called the wattle bird, about the size of a snipe, which is here reckoned a great delicacy. Oysters are in great perfection, and the rocks are literally covered with muscles. Some, though not all of the poisonous serpents found in New Holland, are also seen here. Among these are one called the black snake, resembling a piece of burned stick, and another called the yellow brown snake.

This island produces copper, iron, alum, coal, slate, limestone, asbestos, and basaltes, all in great abundance, with the exception of copper. It also affords cornelian, rock crystal, chrysolite, jasper, marble, and many petrifactions. In the neighbourhood of Launceston there are mountains of iron-ore, which must prove a source of great wealth to the island when once it is sufficiently populous. Coal also is met with in extensive beds, particularly near Macquarrie harbour, where an attempt is just made to work it by means of convicts, under the control of a party of military.[d] The success of this attempt is yet unknown.

Van Diemen's Island is divided into two counties, Buckingham in the south, and Cornwall in the north. The capital of Buckingham county is Hobart Town. This place is described in the official account of Governor Macquarrie's visit in 1821, as exhibiting a most encouraging contrast in its present state to its appearance in 1811, the period of his former visit. Instead of wretched huts and cottages, of which it had then consisted, there were substantial buildings laid out in regular streets; several of the houses were of two stories, and in a respectable style of architecture. It contained the usual public buildings, four water-mills, a signal post, and telegraph. The people discovered much industry and enterprise, and a plan was formed for the construction of a commodious quay.

The county of Cornwall does not differ materially from Buckinghamshire, being equally fertile, and rather more so in proportion to its area, as the greater part of the land is lower and better watered. The settled parts are all on the Tamar river, and in its vicinity. The village of Launceston is delightfully situated at the junction of a tributary called the South Esk with the Tamar; but, since the establishment has been formed at George Town, it has not the advantage of being the chief place in the county. The situation selected for George Town is not only in itself beautiful, and well supplied with water, but, being at the mouth of the river, is better fitted for keeping up the communication between this part of the colony and other countries by sea. Governor Macquarrie has marked out four other situations for townships in the interior, along the basins of the Tamar and Derwent.

In all the inhabited parts good roads have been made between Hobart Town and the different settlements.

The exports from this island consist of cattle, sheep, wool, flour, corned meats, dried fish, hides, barilla, tanning bark, seal skins, whale oil, and spars. It appears from the notices in the Sydney Gazette, that vessels have sailed for the Mauritius and other foreign parts, laden with 1200 sheep or fifty cows at a time.[e] Wool has every appearance of becoming a staple commodity in this country, as both its quantity and quality have been very much improved by the introduction of the Merino breed of sheep, which is found to succeed as well, if not better, than in any other part of the world. The great fertility of the land, with the present scanty state of its nascent population, enables it to export corn and other landed produce, wherever a market presents itself. When the crops on the river Hawkesbury, in the parent colony, were destroyed by a flood in 1817, about 20,000 bushels of wheat, besides 380 tons of potatoes, were sent from this island to supply the deficiency thus unexpectedly created. Persons zealous for the prosperity of the colony, in a sense strictly commercial, have been very desirous that the liberty of brewing and distilling liquors from grain, both for home consumption and exportation, which has hitherto been withheld by the colonial regulations, should be granted to the settlers. The prevailing passion for these articles, with all the mischiefs attending the excesses to which the greater part of the quantities made are subservient, forms at present a necessary element in commercial and political economy; and the important problem is not yet settled, how mankind might be delivered from their evil consequences without the creation of fresh mischiefs?—A court of civil and criminal justice is established at Hobart Town, but pleas exceeding the value of 50*l.*, and capital criminal trials, are removed to Sydney. On the whole, this country presents at this moment such an encouraging aspect, that, for those inhabitants of Great Britain who, in their own country, labour under a want of satisfactory prospects from the application of a small capital, and possess the means requisite for undertaking a distant emigration, Van Diemen's Island is considered as the most eligible country, and the tide of emigration to it is consequently very strong. For a few years three or four vessels annually have sailed from Britain, laden with emigrants possessed of more or less capital. Not only entire fa-

[a] "Dunes," sands bordering the sea-coast.—P.
[b] "Dans la profondeur des bois," in the depth of the forest.—P.
[c] "Ficoïde," Mesembryanthemum. —P.

[d] MS. Letters from Lieut. Governor to the Colonial Office. MS. Letters from Surgeon Spence, appointed on the expedition, and others.—Tr.
[e] See the Sydney Gazette, July 18, 1818.

milies, but neighbourhoods and clans have in some instances embarked in that distant speculation, that, while each establishes his own fortune, they may encourage and comfort one another's efforts, by keeping up those habits of social intercourse which had been formed in their native country.

In a small tract on Van Diemen's Island, by Mr. Evans, surveyor-general, a table is given containing the names of all the settlers to whom lands have been assigned, with the number of acres given to each. In this table there are the names of 694 persons, of whom only 309 have lands to the extent of 100 acres, and all the latter have under 500 except sixty. The largest estate (3000 acres) is that of Lieut. Col. Thomas Davey. Horatio William Mason, Elizabeth Paterson, and Edward Abbot, have each 2000, and other six have 1200 or upwards. The British government gives to emigrants among its own subjects, lands in proportion to the capital which they take along with them. None get any encouragement who take less than 500*l.* sterling. These generally receive a grant of 500 acres; but the extent given is in some measure left to the discretion of the governor. No person is prohibited by the British laws from settling at his own risk; but some friends of that new world wish that greater positive encouragement were given to virtuous persons in the humblest spheres of life, whose society might operate as a correcting ingredient in the motley population.

Acres of land in cultivation in 1819			89,746
Ditto in 1820			116,641
Horses, male and female, in 1819,			363
Ditto in 1820,			411
Horned cattle in 1819,			23,124
Ditto in 1820,			28,838
Sheep in 1819,			172,129
Ditto in 1820,			182,468
Free persons and settlers in 1819,	Men	887	
	Women	411	
	Children	674	
			1,972
Ditto in 1820,	Men	1111	
	Women	530	
	Children	1060	
			2,701
Convicts in 1819,	Men	1954	
	Women	278	
			2,232
Ditto in 1820,	Men	3107	
	Women	370	
			3,477[a]

We now return to Wilson's Promontory, on the continent of New Holland. The whole coast, from this to Cape Farewell, in 129° 35′ east longitude from Paris, receives from M. Péron the designation of Napoleon's Land, but Captains Grant and Flinders, who had previously visited a large portion of it, have given many places names different from those of the French navigators.

Mr. Bass, after having turned the southern point of New Holland, discovered Western Port, a superb basin, which, when more minutely explored by Baudin's expedition, was found to contain two islands instead of one. Governor King's Bay, in which Port Philip is situated, was discovered by Captain Grant in 1800. This English navigator believed that he had followed the coast from the 142d degree of east longitude to 146° 45′;[b c] but it appears from the longitude which he assigns to Cape Otway,[d] the Cape Marengo[e] of the French, that his discoveries must have begun a degree farther west than he thought. His Cape Northumberland, the most westerly of his discoveries, corresponds to the Cape Boufflers of the French, and his Cape Bridgewater to their Cape Montaigne. But his island of Lady Julia Percy is badly delineated, and, according to the more exact observations of Baudin and Freycinet, cannot have the extent which he assigns to it.

This coast seems to contain several fertile places. Cape Otway and Cape Northumberland are covered with fine forests. The large gum-bearing trees prevail in the neighbourhood of Port Philip and Western Port. In that quarter there are some extremely hard and heavy kinds of timber, among which is a species of mahogany.[f g] Different sorts of wild apples and plums grow there; likewise some leguminous species, which seem to be adapted for human sustenance. There is a species of indigo, and a grass which has been called kangaroo grass. Besides the animals common to the whole continent, wolves[h] and wild cats[i] have been found there. Some traces of a very large quadruped have been believed to be observed. Among its numberless birds are distinguished some beautiful paroquets, as the *Psittacus fimbriatus*, and *tabuan*, the laughing bird, and the bell bird.[k] The cries of a flock of the latter resemble the sound of the bells on the necks of wagon horses, announcing their approach at a distance. The sea abounds with fish, and there is excellent salmon in the rivers.

The inhabitants of these coasts differ from one another, both in moral and physical character. Captain Grant saw some of that race who approach to the ourang-outang, whose hideous picture we have already drawn. They eat birds in a raw state, with all the entrails. The other savages accuse them of cannibalism.[l] In the neighbourhood of Western Port, the inhabitants are more numerous, seem to be better formed, and live in villages under chiefs, who deck their heads with the feathers of the black swan, paint their bodies with red, white, and yellow pigments, and are carried on the shoulders of their subjects.[m] But this tribe manifests a

[a] In 1821, the population was — Free Colonists 3,246; Convicts 3,939; Total 7,185. Exports £60,000, chiefly grain and copper.—P.

[b] "139° 40′ to 144° 25′ E. from Paris."

[c] Grant's Narrative of a Voyage of Discovery, p. 68, &c. London, 1803.

[d] "142° 40′ E. from Paris." In the original "Cape Albany Otway."

[e] "141° 30′ E. from Paris, as determined by the French."

[f] "Acajou."

[g] Tuckey's Voyage to establish a Colony at Port Philip, p. 167, 230, 326.

[h] Idem, p. 201.

[i] Grant, p. 159.

[k] Idem, p. 112.

[l] Idem, p. 114, 115.

[m] Tuckey, p. 170—178.

haughty sense of its power, and a ferocious and inhospitable character. In filthiness of habits they surpass the most disgusting picture that imagination can form.

The country around Western Port, provided with water and wood, rich in plants and animals, affords a promising locality for a European establishment. The shores of Port Philip, where the English wished to settle a colony, has an excellent vegetation, but is deficient in fresh water.

The country to the north of Cape Northumberland was called Napoleon's Land by Captain Baudin, who discovered it.[a] This coast has a direction from S. E. to N. W. Between Cape Northumberland and Mollien Bay,[b] the shores seemed to M. Péron to be dreary and barren in the extreme, presenting the uniform aspect of one continued arid rock, rising like a wall from the water's edge. Yet numerous columns of smoke were observed, indicating a considerable population. An inland survey would perhaps modify the views entertained by our navigators, who admired nothing but the immense flocks of sea-birds which covered the coast, and the quantity, no less wonderful, of seals and dolphins with which the sea swarmed.[c] At the peninsula of Fleurieux, which projects to the west, the face of the country begins to change. More elevated in the interior, and more indented on the shore, it opens to form the Gulf of St. Vincent,[d] which is eighty-three miles long, and from twenty-two to twenty-six broad.[e] This gulf is bounded on the north-west by York Peninsula, which is shaped exactly like a boot, and ends in Spencer's Cape.[f] At the mouth of the same gulf is Kangaroo island,[g] 193 miles in circumference.[h] On the west side of York Peninsula is Spencer's Gulf,[i] between Cape Spencer and Cape Catastrophe.[k l] In the middle of the entrance there are some islands, called by the French Berthier's Islands. This gulf penetrates 190 miles[m] into the country, and terminates in two channels too shallow to allow the boats of the Casuarina schooner to explore farther. The existence of a large river in this place is probable; but the probability was not confirmed by any difference to be observed between the water here and that of the neighbouring sea. Yet it is possible that the waters of some river may flow in a direction somewhat different from the exact track of our navigators.[n] On its western shore we find a harbour, which was called by the French Port Champagny, one of the finest and safest in New Holland. In the three noble basins of which it is formed, the bottom is every where excellent, and the depth is from ten to twelve fathoms to the very shore. The mouth of it is protected by La Grange's island, about twelve miles[o] in circumference. Its shores present a complete contrast to the sterility and monotony of those of the neighbourhood, being finely elevated, and covered with thick forests. M. Péron found no fresh water, but the strength and freshness of the vegetation, and the elevation of the land, showed that there must be some rivulets, or some considerable spring.[p]

To the west of this large gulf is Cape Catastrophe, on the south of which there are some reefs and a small archipelago.[q] Here Captain Flinders lost one of his boats with a number of men. From Cape Lincoln[r] to Cape Correa, the coast, which contains a creek or bay,[s] has not been narrowly examined. Lewis Bay[t] presents an extent of coast of more than forty miles,[u] where our navigators saw many fires belonging to the inhabitants. The islands here are very numerous. St. Peter's Islands,[x] discovered by Peter Nuyts in 1628, occupy, on the Dutch charts, a large space in every direction.[y]

Nuyts's Land begins about the 132d degree of longitude, and the coast in this part runs almost due west, giving a much greater breadth to this vast continent in its northern than in its southern part. This also terminates what may be considered as the southern shore of New Holland.[z] It is unfortunate that the discoverer has left us no circumstantial description of it. Two modern voyagers, Vancouver and d'Entrecasteaux, have minutely examined its western part, but the east part, which forms a sort of gulf, by turning somewhat to the north, deserves to be better known than it now is.

D'Entrecasteaux only once anchored on this dangerous coast. Legrand's Bay, the place where he made some stay, is a vast basin, protected by more than twenty islets, and by numerous rocks and shallows, extended over a surface of about 60 square miles. Some of these islets are composed of granite, containing black mica. There are likewise needle-shaped crystals of black schorl. Other islets have on their highest parts calcareous rock, in horizontal strata. The rock is fine-grained, with some small cavities, and without any appearance of shells. The shore of the continent consists of a calcareous sand, sometimes in heaps. Fresh water is found at certain intervals along the shore. At a distance of four hours' walking a large lake was found, the margins of which were marshy on the side towards the sea, with which it communicated.

Among the plants which Labillardière observed in

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[a] Captain Flinders lays claim to the prior discovery of all the coast from Nuyts' land to the 139° longitude, where he met Baudin's expedition in its progress westward.—P.

[b] "Baie Mollien."

[c] Peron, I. 317—324.

[d] "Golfe Josephine."

[e] "30 by 8 to 10 Fr. leagues."

[f] "Cape Berthier."

[g] "Isle Decrès."

[h] "Near 70 Fr. leagues."

[i] "Golfe Bonaparte."

[k] The entrance is between Capes Berthier, (Spencer,) and Turenne. Cape Brune, (Catastrophe,) is farther west than Cape Turenne.—P.

[l] "Cape Brune."

[m] "70 Fr. leagues by 10 to 25 broad."

[n] Instead of this sentence, is the following in the original: "It is also possible that a strait passes from this extremity of the gulf to the neighbourhood of Point Liancourt, (Cape Lincoln,) and Cape Correa."—P.

[o] "4 or 5 Fr. leagues."

[p] Péron, I. p. 327.

[q] Laplace's islands.

[r] "Pointe Liancourt."

[s] "Qui forme un enfoncement," which forms a bight or bay.

[t] "Baie Louis."

[u] "More than 15 Fr. leagues."

[x] "L'archipel de St. Pierre," St. Peter's archipelago.

[y] The author, in the original, supposes this archipelago to include the Josephine Islands, and Eugene's Island, among the late French discoveries. He also observes, that the archipelago of St. Francis, on the old Dutch charts, is the archipelago *de la Recherche*, a recent French discovery.—P.

[z] Desbrosses, Histoire des Navigations aux Terres Australes, I p. 342.

[a] Rossel. Voyage de d'Entrecasteaux, I. p. 213.

this wild country, so seldom visited by any European, are several new species of the new genus called *Banksia* by Forster, belonging to the family of the *Thymeleæ*; also the *Eucalyptus cornuta*, a new species; a new papilionaceous species, called *Chorizema ilicifolia*; and another new plant approaching to the genus *Iris*, and denominated *Anigozanthos rufa*. On the sandy borders of the sea was found the grass known under the name of *Spinifex squarrosus*; and a beautiful species of *Leptospermum*, with silvery leaves.[a] Among the animals are found the small seal[b] of Buffon, but the head is smaller than the neck, and the ears are conical, and not open, as described by that naturalist. Among the birds are the *Burgomaster gull*[c] of Buffon; the penguin, called *Aptenodytes minor*; the Molucca parrot, swans, and cassowaries, which were seen by the French navigators. In December, one of the summer months in this part of the world, the weather was cold enough to oblige them to use fires; it was in the mean time very rainy. Some savages were seen in a state of complete nudity, but they kept aloof from their visitors.

Vancouver stopped chiefly at King George's Sound, one of the best harbours on this coast. The naturalist Menzies, one of his companions, made some curious observations on the country. The shores contain hills of middling height, and some high bluffs, the feet of which were destitute of verdure, and worn by the waves of the troubled ocean. In the interior are mountains of limestone or sandstone, the whitish and notched surfaces of which, in some measure, resemble ruinous buildings. The country near Cape Baldhead is principally composed of coral; a substance not only found on the sea-shore, but on the tops of the highest adjoining hills, which were computed to have an elevation of a thousand feet. The coral retains its natural appearance, and is of various degrees of friability.[d] There are likewise some chalky soils, granite and quartz rocks, and marshes covered with turf impregnated with ochre. The climate appeared to our navigators to be agreeable and healthy. There was a great variety of plants and flowers. In the forests, which were easy of access, and not difficult to penetrate, trees were observed bearing a resemblance to the holly; others which seemed to be the gum-bearing species found in New South Wales; and two kinds of odoriferous woods. Vultures, paroquets, parrots, and a variety of small singing birds, peopled the woods. Pelicans, ducks, and black swans, made their appearance in great abundance. The natives seemed to be a wandering race; their villages, recently deserted, were composed of wretched huts, in the shape of half a bee-hive.

Mount Gardner, near Port George, has the appearance of a volcanic cone.[e]

That part of New Holland which projects most in a south-west direction, has the name of Leuwin's Land, from the Dutch word for "the Lioness," which was the name of the first vessel that touched at it. Its boundaries are arbitrary. We shall first take notice of the great promontory, which forms three capes, Hamelin, Mentelle, and Naturaliste. Near the last of these, Depuch, the naturalist, found a beautiful granite, in regular and very numerous layers, which elucidated a contested point in mineralogy. Geographer's Bay,[f] which was discovered in Baudin's expedition, has marshy coasts, with salt pools, tantalizing the eye with the counterfeited appearance of a river. Here some feeble, wild, and stupid savages, lead wandering lives. Yet they had formed plantations of trees, which had the appearance of being intended for devotional meetings; and they had drawn some regular figures, to which a mysterious meaning seemed to have been attached. The ground, though covered with beautiful trees, particularly the *Melaleuca*, the *Xanthorrhœa*, and a fine close sod, seemed to be impregnated only with brackish water.[g] Here were seen the phenomena of the *mirage*, with its varying illusions.

Edel's Land comprehends the middle part of the west coast. Swan River, explored for fifty-six miles[h] of its course by M. Bailly, waters a low country, which is pervaded by limestone strata, and covered with beautiful *Eucalypti*, on the branches of which were seen countless flocks of beautiful parrots.[i] The shallows prevented this navigator's boat from proceeding farther. He perceived a lofty chain of mountains at a distance. He heard a bellowing much louder than that of an ox from among the reeds on the river side, which made him suspect that a large quadruped lay somewhere near him. This circumstance is the more remarkable, as we are told by the learned and faithful Dampier, that he found, near Shark's Bay, the head and skeleton of a hippopotamus, and gathered some teeth of the lower jaw of the same animal, which were a little bent.[k]

The country in which Swan River is situated is called, in some Dutch maps, Dinning's Land.

To the north of this river the land seems to have a moderate elevation. It is skirted with sandy islands, breakers, and coral reefs. The isle of Rottnest and Houtman's Abrolhos,[l] where Pelsart was shipwrecked, are the best known points. Pelsart found the coast of the main land destitute of plants and trees, and covered with large ant-hills like huts; the air was full of flies, and fresh water was exceedingly scarce.[m]

Endracht's Land,[n] or the land of harmony, has a very low coast. The mountains are seen in the interior at a distance of 25 miles.[o] The sandy country round the large bay, called "Shark's Bay," produces sea-fennel, brambles, and a long grass, growing in detached tufts. The *Pterocarpus draco*,[p] the mangrove, and some other trees, also grow there; the trunks are very thick, but not more than ten feet high. Dampier says that he saw

[a] Labillardière, vol. I. p. 402, 404, 412.
[b] "Petit Phoque."
[c] "Goëland bourgmestre."
[d] Vancouver's Voyage, vol. I. p. 62 and 77.
[e] Atlas du Voyage aux Terres Australes, pl. VI. fig. 1.
[f] "Baie du Géographe," so called from one of the vessels of the expedition.—P.
[g] Péron, I. p. 77. Leschenault's Journal, MS.
[h] "20 Fr. leagues."
[i] Bailly, quoted by Péron, I. 178, &c.
[k] Dampier's Voyage, IV. p. 113.
[l] *Abrolhos*, Portuguese, breakers.
[m] Desbrosses, t. I. p. 454.
[n] *Endracht* or *Eendragt*, Dutch, concord.
[o] "8 or 9 Fr. leagues."
[p] "L'arbre a sang-dragon," dragon's blood-tree, but the species not particularized.—P.

rabbits with extremely short fore legs. These were kangaroos. The guana lizards are very large, and their appearance made this intelligent navigator shudder.[a] The trees and shrubs had generally blue flowers. According to M. Péron, this whole coast is covered with petrified shell-fish, and the plants are very often encrusted with petrified matter. The unfortunate naturalist Riche remarked, that a new Perseus seemed to have carried a second head of Medusa over these wonderful shores. The incrustations are formed with extraordinary rapidity. They were found covering the shrubs, the remains of animals, and even portions of their excrements.[b]

The peninsula of Péron divides the inner part of Shark's Bay into two gulfs, called by the French *Havre Freycinet* and *Havre Hamelin*,[c] both of which afford good anchorage. Fresh water seems to be every where wanting; vegetation languishes; but the seals, the whales, and fish of all kinds, including the large sea-serpents,[d] render the sea as populous as the land is desolate. The islands called Dorre[e] and Dirk Hartog, though very sandy, support shrubs of *mimosa*, and a great number of kangaroos.[f]

De Witt's Land comprehends all the north-west coast of New Holland, part of which is, in some maps, denominated "Dampier's Land." It is the least known of the whole. Baudin's expedition has not cleared up any one of the doubts to which the researches and conjectures of Dampier had given origin. This English navigator had examined four or five points of the coast, and was persuaded that they belonged to a long chain of islands, behind which, as behind the Sunda islands, vast gulfs, and perhaps an inland sea, would be found. All this coast, says Dampier, is covered with a succession of white sandy downs. For half the year the north-west winds urge the waves with violence against the coasts, and render the tides extremely irregular. The surrounding sea is covered with marine plants, crabs, and a sort of sea-wrack which resembles fish spawn. Very little water or grass is found on the coast. It seems even to be deserted by birds and all sorts of animals. The only remarkable productions are, a tree the wood of which is red like that of sassafras, and another of the dragon's blood kind; the latter is of the size of an apple tree, with black leaves and whitish bark. The gum exudes from the knots and fissures of the trunk.

Some miserable tribes of savages wander on the islands and coasts of this country. According to Dampier they are a tall, straight, and meagre race. Their limbs are long and slender, their heads large, their foreheads round, the eye-brows bushy, the nose square, the lips thick, no beard, the hair black and crisped, and the complexion completely that of the negro. Two teeth of the upper jaw are universally wanting, either naturally or in consequence of being artificially extracted, as is the practice among some of the people of Africa.[g] Their food consists of shell-fish and other fish. Their lances and swords are made of wood. They sleep in the open air and seem to live exactly like the inferior animals.

Baudin's navigators fixed several detached points But the great question of the existence of aqueous communications with the interior of the continent has not been in any degree elucidated, notwithstanding all the learning and patience which Messrs. Freycinet and Boullanger bestowed in calculating and combining the observations which have, at different periods, been made.

The Cape Murat of M. Freycinet's atlas seems the same with the Cape Willem of the old Dutch charts, and of the atlas of D'Entrecasteaux. Willem river, on the south side of the promontory, can furnish no facilities for exploring the interior; but to the north-east a gulf, sixty miles[h] wide at the mouth, and containing several islands,[i] has a circumference not yet ascertained, and perhaps a connexion with some inland sea. Capes Poivre, Malouet, and Dupuy, which form one large promontory, may as well belong to a separate island as to the continent of New Holland. Lowendal and Hermit islands extend northerly from Cape Dupuy. Thence to Rosemary island, (*ile Rosmaria*,) which forms part of a little group called Dampier's Archipelago, the coast of the main land is unknown. But from the 116th to the 120th degree[k] of longitude, it seems to form an uninterrupted and straight line of low land. Opposite to this part of the coast the Archipelago of Forrester[l] is situated, one of the islands[m] of which is composed of large pentagonal prisms of basalt, in some places rising into walls, in others forming an extended tesselated pavement like the Giant's Causeway. In several places insulated columns shoot up from the bosom of the deep.[n] The Geographer's Shallows, and those of the *Planariæ*, occupy a large space. Bedout's island[o] is fifty-six miles[p] from the continent.

Arriving at the 121st degree[q] of longitude we find a gap in the coast of thirty or forty miles,[r] and perhaps an opening into the continent. Its line of direction then turns rapidly to the north-west and north, a change vaguely expressed in old charts, which merely carry the whole coast too far to the west. Cape Missiessy, and Cape Bossut, preceded by Casuarina Reef and Cape Villaret belong to the continent, or else to a large island; but between the last mentioned promontory and Cape Huygens, we find, in Freycinet's atlas, the same large and deep opening formerly pointed out by Dampier in the same situation. An island of considerable size, near to Cape Huygens, has received the name of Gantheaume. If an attempt had been made to enter this opening, an ampler field would have been undoubtedly furnished for doing a similar honour to the names of other celebrated men. From Cape Huygens the coast runs north, with a slight westerly inclination, as far as Cape Berthollet. Here we find another gap, and very probably a passage

[a] Dampier, vol. IV. p. 101—104. edition in 12mo. Amsterdam.
[b] Péron, Memoire sur quelques faits, &c.
[c] Freycinet's and Hamelin's harbours.
[d] "Les grands serpens de mer?"
[e] Barren islands—*Dorre*, (Dutch,) dry, barren. P.
[f] Leschenault's Journal, MS.
[g] Dampier, vol. II. p. 141.
[h] "A degree."
"Iles Rosily, Thevenard, &c."
[k] "114° to 118° E. from Paris."
[l] "Archipel Forestier."
[m] Isle Depuch.
[n] Péron, I. p. 130.
[o] "Ile Bedout."
[p] "20 Fr. leagues."
[q] "119° E. from Paris."
[r] "12 to 15 Fr. leagues."

which may communicate with that on the south of Cape Huygens. The islands Lacepede and Carnot, and the "Whale Bank,"[a] front the entrance of this channel or gulf. From Cape Borda to Cape Rhulière, for five degrees of longitude, the coast runs north-east; and, though not completely examined, it presents no indications of any passage. Old charts mark, in this part, several deep bays, and a tunnel-shaped gulf, on which the French expedition has thrown no additional light.

Opposite to this coast we have the important and detached island of Adele, with the remarkable Cape Mollien, which, in the earliest sketches of charts, was represented as a part of the continent. Then follows the large archipelago, called by the French navigators the Archipelago of Buonaparte, and formerly marked on the old charts as "certain islands seen by Saint Allouarn." These countries present every where the most sterile and forlorn aspect. Whitish rocks shoot up in square, or pointed, or curiously projecting forms. Some of them have the appearance of mountains fallen on other mountains. No residence is furnished for man in a country from which vegetation is banished, and which the sky, always dry and scorching, never visits with a genial dew.[b] The leading islands go under the names of Keraudren, Fontanes, Cassini, and Bougainville. To the north of this last, which is the largest, is the large "Bank of Holothurias," peopled with myriads of molluscas. From the mast-head a large island is seen lying north and south, which is perhaps the commencement of some chain of islands.

From Cape Rhulière to Cape Fourcroy, the coast forms a large concavity, with a south-easterly direction. Between the bank of Medusas and the Barthelemy islands, M. Freycinet's inquiries present a wide gap, but the old charts give no indications of any passage.

De Witt's Land ends at Cape Van Diemen, which we think ought to preserve its original name, though the atlas of the "Voyage aux Terres Australes" gives it the name of Leoben. It is a frivolous procedure to change the names of old discovered countries, merely because a more recent navigator may have corrected their position by a few minutes of longitude.

From the preceding view of the north-west coast, we find it presenting a series of gaps, which afford much scope for future discoveries. The north coast appears at first view to have been more completely explored. From Cape Van Diemen to the Gulf of Carpentaria, a Dutch chart lays down the coast in a positive manner.[c] It marks Van Diemen's Bay, the waters of which were found to be white and luminous, in the same way as we have already observed to be the case with the Molucca sea.[d] This bay seems to be bordered by a chain of mountains. Farther east, the same chart lays down a bay under the name of the "Bay of Difficulty,"[e] surrounded with low lands; and the river Speult, at the mouth of which are the Crocodile islands. The east part of this coast has got the name of Arnhem's Land, a name which some think should comprehend the whole coast from Cape Van Diemen eastward, in order that the name of Van Diemen's Land, as applied to the westernmost portion of it, may be abolished, and become exclusively appropriated to the island now so famous on the south of Bass's Strait.[f] All ambiguity in this particular may, however, be prevented, by the easy expedient of assigning to the latter, as we have done in the preceding pages, the name of "*Van Diemen's Island.*"

The Gulf of Carpentaria, surrounded by a country called Carpentaria's Land, presents in the Dutch charts so many mouths of rivers, as might tempt us to regard it as one of the chief recipients for the waters which proceed from the interior of New Holland. The leading ones seem to be Tasman's River in the west, and Caron River in the south. But we are told that Captain Flinders, on exploring these shores with the utmost care, found all the river beds either dry or filled with sea-water. A large island, situated in the west part of this gulf, to which the Dutch navigators gave no name, has received from the Germans that of Busching's Island.

On the east side of the Gulf of Carpentaria is Cape York, which is the northern extremity of this continent, projecting in such a manner as to form the strait called Endeavour Strait,[g] which separates it from the island of New Guinea, and connects the Molucca sea with the Great Ocean on the south and east. The coast, now skirted with a line of reefs, runs first south-east to Cape Flattery, then turning nearly due south, it presents us with the small river called Endeavour River, where Captain Cook saw some caïmans, (a kind of crocodiles,) and oysters of extraordinary size. Here the savages, like the Otaheitans, baked their bread in furnaces dug in the ground. Their canoes were similar to those of the Phenicians.[h] Cape Tribulation nearly proved fatal to this unwearied navigator. Magnetic island, near Halifax bay, is so called from the influence which it exerts on the mariner's compass in the ships which approach to it. Here the coast turns again to the south-east, as far as the Great Bay of Inlets, remarkable for a number of indentations which seem to indicate either channels or rivers. The easterly direction of the coast ends with Hervey's Bay, which has Sandy Cape for its eastern extremity. At this bay the huts of the savages are built with some degree of solidity, and roofed with the bark of a kind of tea tree, the *Melaleuca trinervis* of White. Proceeding almost due south, we find Pumice River, where Captain Flinders thought he found some evidences of the existence of a volcano in the neighbourhood.[i] Several large rivers discharge themselves into Glass-house Bay, where stones of volcanic appearance[k] are also found. After passing Cape Byron and Shoal Bay we arrive at Port Macquarrie, the mouth of a navigable river lately discovered by Mr. Oxley in his second exploratory tour.

We have now made the circuit of the shores of this vast and singular country, but have been unable to fol-

[a] "Basse des Baleines."
[b] Péron, I. p. 137.
[c] See Valentyn's Description of Banda.
[d] See page 598.
[e] Moeyelike Bocht, or moeilyke bogt, "*baie difficile.*"—P.
[f] "The eastern part of this coast has the name of Arnhem's Land, which it would be proper to extend as far as Cape Van Diemen, that the name of Van Diemen's Land might be abolished, which would otherwise have a tendency to confound this region with Van Diemen' Island."—M. B.
[g] Torres strait, (or that part of it adjoining New Holland.—M. B.)—P
[h] Cook, in Hawkesworth's Collection, III. p. 570—572, &c
[i] Flinders, quoted by Collins, II. 235, 242.
[k] "Pumice stones"

low it without several interruptions. The interior completely escapes our inquiries. No gulf or large river has put it in our power to pass within the mystic circle of its general outline. Here research gives place to reasoning and conjecture. Does the territory consist of an immense sandy desert, by which the rain from the heavens is absorbed? This supposition is favoured by the burning winds which on all sides proceed from the interior. On the other hand, the inequalities which must exist in a territory so extensive, the heights of such mountains as have been seen, and the general copiousness of the rains of the torrid zone, have been supposed to favour the probability of its giving birth to large rivers. Several streams undoubtedly exist which have not been perceived, even by those navigators who were within sight of their mouths, in the same manner as the river at Port Macquarrie, passed unobserved by Captain Flinders, when he sailed along the coast, at a moderate distance, and described the rocky prominences which it presents. But if there had been any river of uncommon magnitude, it is not probable that the freshness which it would have imparted to the sea water in its vicinity would have escaped observation, and not led to more minute investigations. The only inland parts yet examined are near the southern extremity, where the whole breadth of the continent is only about a fourth part of that of its northern and central portions. If that which was explored by Mr. Oxley, is to be considered as a faithful specimen of the whole, we must conclude it to consist of an unvaried level surface, part of which is rendered habitually marshy, and is frequently laid under water, by becoming the termination of large or numerous rivers; part consists of a real lake, and part probably is permanently arid, like the African sands on the east and west of the Nile. But there may still be chains of mountains, or detached *oäses*, which are fertilized by benignant rains, and rendered more moderate in temperature by their comparative elevation. Some have supposed that this whole land may be nothing more than the border of an immense lagoon, resembling, on a larger scale, some of the small islands of Polynesia. Some one of these hypotheses must be adopted unless we still believe that large or numerous rivers are concealed in channels connected with the openings which navigators have so imperfectly described. These channels may make the supposed shores of the continent turn out to be mere islands or peninsulas.[a] Or we may suppose rivers of this kind, like those of Madagascar, to be hid behind the marshes by which Edel's Land is encircled.

In order to determine these questions, it has been proposed to send an expedition to penetrate the country from Spencer's Gulf. For such an expedition, men of science and of courage ought be selected. They ought to be provided with all sorts of implements and stores, and with different animals from the powers and instincts of which they may derive assistance. They should have oxen from Buenos Ayres, or the English settlements, mules from Senegal, and dromedaries from Africa or Arabia. The oxen would traverse the woods and the thickets; the mules would walk securely among rugged rocks and hilly countries; the dromedaries would cross the sandy deserts. Thus the expedition would be prepared for any kind of territory that the interior might present. Dogs also should be taken to raise game, and to discover springs of water; and it has even been proposed to take pigs, for the sake of finding out esculent roots in the soil.[b] When no kangaroos or other game are to be found, the party would subsist on the flesh of their own herds. They should be provided with a balloon, for spying at a distance any serious obstacles to their progress in particular directions, and for extending the range of observation which the eye would take of such level lands as are too wide to allow any heights beyond them to come within the compass of their view. It has been proposed that the vessels which take the persons and stores belonging to the land expedition, should leave that part of the coast where they have been disembarked, and after going to such countries as could furnish them with fresh stores, should repair to different stations on the coast. This land expedition is recommended, in the first instance, to direct its course for the Gulf of Carpentaria. It will probably find in this passage, chains of mountains lying north and south, like the peninsulas situated on the coast, and will consequently pass along the intermediate valleys. If, contrary to all expectation, their progress should be arrested by chains in a transverse direction, they might turn east to the Bay of Inlets, or north-west to Dampier's Gulf,[c] or south-west to Swan River. It seems inconceivable that all these routes should be equally intercepted by deserts, or impracticable mountains. The journey might be allowed a year or eighteen months, which would be only at the rate of four or five miles[d] per day for the longest route. On the most unfavourable supposition, the party could return to Spencer's Gulf. The author of the present work has discussed this project in conversation with the enlightened and indefatigable traveller, M. Péron, who saw no insuperable obstacle to its practicability, except the existence of an immense ocean of sand occupying the whole interior of the continent, which to him appeared extremely probable. Yet, as the central deserts of Asia and of Southern Africa maintain flocks and tribes of shepherds in their oäses, our scientific nomades might in like manner find some stripes of verdure, and some fresh-water springs and lakes, especially after the close of the rainy season. The health of the travellers in this unknown soil, perhaps exhaling noxious vapours, might be protected by the constant habit of lying in hammocks suspended from the branches of trees. On the modification of procedure that would occur in executing such an interesting plan, it is needless to speculate. Since these ideas were suggested, however, the two journeys of Mr. Oxley from the British colony have afforded, as we have seen, a specimen of part of the interior, and perhaps of a large proportion of it. Yet it is unquestionably desirable that similar expeditions, with additional improvements, should be undertaken from various other parts of the extensive coast of New Holland.

[a] This remark in the original is confined to De Witt's Land.—P.
[b] By the Author.—P.
[c] "L'entrée de Dampier," Dampier's Entrance, referred to page 611
[d] "One or two leagues."

Table of Geographical Positions in New Holland, and the adjoining Islands.

Places.	South Latitude.			Long. East from Lond.			Authorities.
	deg.	min.	sec.	deg.	min.	sec.	
VAN DIEMEN'S ISLAND.							
Cape Pillar	43	14	0	147	21	4	Boullanger and Freycinet.
Cape Péron (Maria Island)	42	46	30	148	14	45	Idem.
St. Helen's Point	41	20	30	148	37	45	Idem.
Cape Portland	40	42	25	148	5	15	Flinders' Chart.
Entrance of Port Dalrymple	41	3	30	147	11	0	Flinders & Freycinet.
Cape Lenoir (Hunter's Islands)	40	29	30	144	52	25	Freycinet.
South-west Cape	43	33	40	146	4	15	D'Entrecasteaux
South Cape	43	39	0	146	54	25	Idem.
NEW SOUTH WALES.							
Wilson's Promontory	39	10	30	146	40	25	Freycinet.
Cape Howe	37	27	0	150	5	15	Flinders.
Sydney Cove (Port Jackson)	33	55	0	151	25	0	Wentworth.
Point Danger	28	8	0	153	52	15	Flinders.
Sandy Cape	24	40	0	153	15	15	Idem.
Cape Capricorn	23	28	0	151	10	15	Cook.
Broad Sound (Bay of Inlets)	22	25	0	149	0	15	Idem.
Edgecombe Bay	20	0	0	148	0	15	Idem.
Cape Flattery	14	56	0	145	20	15	Idem.
Cape York	10	40	0	142	20	15	Idem.
DE WITT'S LAND.							
Cape Diemen (or Léoben)	11	9	0	130	14	15	Freycinet, Boullanger, &c.
Cape Fourcroy	11	58	0	130	0	15	Idem.
Barthelemy islands	13	48	0	129	35	15	Idem.
Lacrosse islands	14	44	0	128	20	15	Idem.
Cape Rhulière	13	52	0	127	17	15	Idem.
Bougainville Island	14	0	0	126	1	15	Idem.
Cape Voltaire	14	15	0	125	33	15	Idem.
Degerando Island	15	22	0	124	8	15	Idem.
Cape Mollien (Adele Island)	15	27	0	123	4	15	Idem.
Caffarelli Island	16	5	0	123	12	15	Idem.
Cape Berthollet	17	10	0	122	5	15	Idem.
Cape Huygens	17	58	0	122	11	15	Idem.
Cape Villaret	18	19	0	121	56	15	Idem.
Cape Missiessy	19	12	0	121	15	15	Idem.
Cape Larrey	19	47	0	119	9	15	Idem.
Depuch island	20	36	0	117	33	15	Idem.
Romarin island	20	28	0	116	30	15	Idem.
Cape Malouet	20	45	0	115	25	15	Idem.
Cape Murat	21	37	0	114	18	15	Idem.
ENDRACHT'S AND LEUWIN'S LAND.							
Cape Cuvier	24	14	0	113	24	15	Freycinet, Boullanger, &c.
Dirk Hartog's Road	25	30	0	113	2	15	Freycinet, Boullanger, &c.
Red Point	27	42	0	114	0	15	Idem.
Houtman's Abrolhos, (southmost point)	29	13	0	114	20	15	Van Kenlen.
Swan river (mouth)	32	4	30	115	46	35	Idem.
Cape Naturaliste	33	27	30	114	59	45	Freycinet, Boullanger, &c.
Cape Hamelin	34	14	0	115	0	15	Idem.
FLINDERS' LAND, BAUDIN'S LAND, (TERRE NAPOLEON,) AND GRANT'S LAND.							
Cape Farewell	31	55	0	131	55	15	Idem.
Cape Malouet	32	10	20	133	5	15	Idem.
Talleyrand Island (Islands of St. Francis)	32	35	0	133	9	15	Idem.
Murat Bay	32	6	0	133	37	15	Idem.
Cape Lavoisier	32	31	0	133	50	5	Idem.
Cape Ambrose Paré	32	43	0	134	1	15	Idem.
Cape Corréa	33	36	0	134	48	15	Idem.
Cape Brune	34	45	0	135	11	15	Idem.
Cape Turenne	35	8	0	136	5	45	Idem.
Marengo Island (middle)	35	9	20	136	26	45	Idem.
Port Champagny (Lagrange Island)	34	44	0	136	5	15	Idem.
Cape Condillac	33	42	0	137	17	15	Idem.
Cape Lafontaine	32	58	0	137	48	15	Idem.
Cape Berthier	35	15	30	136	52	15	Idem
Cape Eliza	35	13	0	137	41	15	Idem.
Gulf St. Vincent (bottom)	34	12	0	138	5	15	Idem.
Cape D'Alembert	35	31	30	137	59	45	Idem.
Cape Bedout (Isle Decrès or Kangaroo Island)	35	56	0	136	34	55	Idem.
Cape Gantheaume (Idem)	36	4	15	137	30	15	Idem.
Cape Sané (Idem)	35	53	0	138	10	45	Idem.
Cape Fermat	36	4	0	139	28	45	Idem.
Cape Bernouilli	37	0	0	139	42	25	Freycinet & Bernier.
Cape Lannes	37	38	30	140	13	15	Idem.
Cape Belidor	38	1	0	140	52	15	Idem.
Cape Montaigne	38	27	30	141	42	15	Idem.
Cape Volney	38	49	0	143	20	15	Boullanger, &c
Cape Marengo	38	54	0	143	50	15	Idem.
Mouth of Port Philip	38	24	30	144	48	15	Idem.
Western Port	38	39	34	145	27	32	Faure.

BOOK LVII.

OCEANICA.

PART V.

New Zealand, New Guinea, and the intervening Islands.

If we could venture on so great an innovation as to give New Holland the classical, and agreeable name of the Great Oceanida,[a] those countries of intermediate size which lie between that continent and Polynesia would be very conveniently designated under the appellation of the Secondary central Oceanidæ.[b] The uncouth jumble of ancient and modern names introduced by navigators, is adverse to any regular classification. The countries now to be described probably present, by their readiness of access, and their excellent climate, the most favourable situations for European colonies. But the most central of them, and particularly New Guinea, are inhabited by a warlike and inhospitable race. We shall begin at the south end of the chain, and proceed in a northerly course.

New Zealand is a country which rises rapidly into importance, in proportion as it becomes more known. Its western coast was discovered in 1642 by Tasman, who describes the inhabitants as of a brownish yellow complexion, with long black hair, and resembling the Japanese.[c]

It was a long time before any thing was added to Tasman's discovery. A French navigator, M. de Surville, doubled the North Cape, discovered Lauriston's Bay, on the eastern coast, and might have anticipated Cook in the honour of completing the discovery. The unfortunate Marion determined the position of Mascarin Peak more precisely than the great English navigator. The celebrated Captain Cook visited these regions in 1779, and found that the strait discovered by Tasman, and thought to separate an island on the north from a great Southern Continent, only separated two islands from each other. The southern island was called by the natives *Tavi Poënammoo*, and the northern *Eahéino-mawe*, names of which Cook disputes the authenticity. Tavi seems to be the name of a lake, and Poënammoo the word for the stone called green jade. Yet this island appears to be called Poënammoo in the map drawn by a native, and published by Mr. Collins.

D'Entrecasteaux fixed the position of Cape Maria Van Diemen; but it was reserved for Vancouver, a pupil of the celebrated Cook, to complete the examination of the southern island, which was placed forty minutes too far east in the first chart. Cook, not able to reach the termination of one of the arms of Dusky Bay, called it "Nobody knows what." His pupil reached it, and changed its name to "Somebody knows what." This seaman-like pleasantry, however, will not answer the purposes of geographical nomenclature.

The length of the northern island is 436 miles, and its medium breadth probably sixty miles. Its extent, therefore, is about 26,160 square miles, or 16,742,400 acres. The Southern island, being 360 miles long, and at an average 100 broad, contains 36,000 square miles, or 23,040,000 acres.[d]

The northern island, being the farthest from the pole, seems to possess greater natural advantages than the other. Its climate is temperate and moist, and the whole, except a few spots on the western side, appears well adapted to cultivation. The southern island is represented by Cook as mountainous, and apparently barren. But this report, founded on a general and distant view, cannot be admitted as finally conclusive, especially as the country contains abundance of trees, and some of prodigious size. In the excursions which the English settlers have made into the interior of the northern island, the soil, though various, was found in general fertile. The landscape on every side displayed the richest verdure, a circumstance which led to the most flattering conclusions, both respecting the soil and the climate.[e] In this particular it is much superior to the territory round Port Jackson in New Holland, although in the same parallel of latitude. The latter is quite parched in summer, while every thing is green and flourishing in New Zealand, an advantage which it owes partly to its insular situation and comparatively small extent, and partly to the greater elevation of its mountains, which attract the dense clouds, and invite frequent refreshing showers. The observations made on the northern part of Eahéino-mawe, apply also to the north end of Poënammoo; for the vegetables which were sown in Charlotte Sound by Captain Cook were found on his return remarkably vigorous, having been rather strengthened than injured by the temperature of winter, though the species were such as would have perished if exposed to an English winter. No frost was seen here by Captain Cook, though he visited it in the beginning of June, which was near the depth of winter. The southern extremity has of course a colder climate. It is also remarkable for the prevalence of cloudy and stormy weather. Violent gales are frequent, and con-

[a] "Grande Océanide."
[b] "Moyennes Océanides du centre."
[c] Dalrymple's Historical Collection, II. 20, &c. Valentyn's Description of Banda.
[d] These dimensions are given by the translator.—P.
[e] Narrative of a Voyage to New Zealand, performed in 1814 and 1815 by John Liddiard Nicholas, Esq. vol. II. p. 231.

tinually change their direction, a circumstance ascribed to the great height of the mountains.[a] Yet the climate was found quite genial in its influence on the health of the English visitors. In Cook's Strait, the north-west are the prevailing winds.

The general face of the country, so far as it has hitherto been explored, is undulating: the hills rising with a varied ascent from inconsiderable eminences to lofty mountains. A continued chain of hills runs from the North Cape southward through the whole country, gradually swelling into mountains, the highest of which, according to Dr. Forster, is Mount Egmont, lying in latitude 39° 16′, and is said to be the same in elevation, as well as in general appearance, as the Peak of Teneriff. It is covered with perpetual snow a great way down, and from calculation and comparisons respecting the snow line, he concluded its height to be 14,760 feet. Others are led by various considerations to assign to it an elevation of 10,000 feet.[b]

The sides of the numerous coves about the Bay of Islands, in the north-east coast of Eahéino-mawe, where the English settlement is fixed, are for the most part composed of soft lamellated stones, probably steatite. In some of them hard or dark brown veins, with traces of iron, are perceived. From the softness of these rocks they are found to exhibit frequent curious perforations, which form picturesque arches, delighting the view of the mariner as he coasts the country. Huge masses of quartz rock are found in the interior, and the rocks have frequent cavities, lined with crystalizations. At North Cape there are hard nodules imbedded in clay. These are most probably iron-stone. Pieces of pumice-stone were found; and this substance is used by the natives for polishing their spears and other instruments of war. Obsidian, a volcanic glassy substance, was also met with. The axes of the natives are generally of green jade. Some are of porphyry. The ochry appearance of some of the rivulets indicates the existence of iron-ore. A powdery ore of manganese is found, and employed by the natives in the barbarous practice of tattooing their faces. About Cook's Strait, Mr. Anderson found the rocks to consist of horizontal strata of yellow sandstone, crossed by veins of quartz. The soil was a yellowish marl. Forster says, that the southern island has a thin layer of black earth, under which lies a rock of pale yellow nephritic jade, intersected by quartz veins.[c] There were also argillaceous basalt, marble, jasper, granite with black mica and white quartz,[d] and various volcanic substances, such as pumice-stone and obsidian.[e] These evidences of subterraneous fire are confirmed by the frequency of earthquakes.[f]

The mountains abound in springs. Each rock seems to be furnished with its provision of fresh water. The rivers, though they have short courses, are broad and deep, and sometimes descend in the form of magnificent cascades.[g] One of these, in Dusky Bay, is thirty feet in width, and has a fall of 900.[h]

This abundance of water, so favourably contrasted with the aridity of New Holland, is propitious to vegetation, and some of the productions of the country are extremely valuable. The mountains which give origin to the river Thames, on the east side of the northern island, produce abundance of timber fit for ship-building. The size of the trees strikes every traveller with admiration. Various pines, quite different from those known in Europe, soar to a height far exceeding those of Norway. There are also various trees of inferior growth, of a fine grain, susceptible of a high polish, and admirably adapted for ornamental cabinet work. There is a tree called *henow*, from which the natives obtain a black dye; a species of cork-tree; and many others, both beautiful and useful, which have not yet been classified by scientific botanists. The supple-jack is met with in all the woods, often fifty feet long, obstructing the progress of the passenger. The tea myrtle also grows here, resembling that of New Holland, which is a sort of *Philadelphus*, or *Melaleuca scoparia*.[i] A different species grows about Dusky Bay, which was used by the crew of the ship Endeavour as a substitute for tea. From the leaves of a tree resembling the American spruce fir, a very wholesome liquor was brewed. This seems to have been the *Dacrydium cupressinum*, the leaves of which are a good antidote to scurvy. There are no native acido-dulces fruits which a European can eat, though some coarse kinds which are relished by the natives. The root of a low common looking fern, called *Acrostichum furcatum*, supplies the natives with their ordinary food. There is likewise an arborescent fern, the root of which is dressed like potatoes, and eaten, and the trunk of this same tree contains a tender esculent pulp, which yields a juice of a red colour. Herbaceous species are prevented from springing by the exuberance and closeness of the forests. The following, however, among others, are found: wild celery, canary-grass, wild parsley, plantain-grass, a species of rye-grass, some flags, and the *Phormium tenax*. This last is a most valuable flax; it has excited great interest in Europe; has been transplanted by the curious; is found to succeed in the climate of France; and considered as most probably an important accession to the riches of this part of the world. Neither palms nor bread-fruit trees exist in this country; the climate probably does not suit them. From Europeans the New Zealanders have got potatoes, *coomeras*, or sweet potatoes, cabbage, turnips, and a species of yam called *tacca*. Their only grain is maize, which they have also obtained from European navigators. From the same source they have got the pumpkin, or gourd, which they cultivate for the sake of the drinking vessels into which they convert it.

The zoology of New Zealand is extremely limited in quadrupeds. The most conspicuous species is the dog. There is a large variety which runs about in a wild state, and a smaller one domesticated. The former howls when it comes in sight of men. It offers no injury to

[a] Cook's Third Voyage, book I. chap. VIII.
[b] "We think, for various reasons, that this estimate of Dr. Forster should be reduced to 10,000 French feet."—M. B.—P
[c] Forster's Observations, p. 10, (in German.)
[d] Voyage de Marion et Crozet
[e] Parkinson's Journal, p. 89.
[f] Forster's Voyage, I. p. 150, (German.) Collin's Account, I. p. 322.
[g] Forster's Observations, p. 42; Voyage, I. p. 153.
[h] "It gives to a part of the bay the name of *Cascade Cove*."—M. B.
[i] "The tea myrtle, (a species of Philadelphus or Melaleuca Scoparia.)"—M. B.

the inhabitants, who prize it highly for its flesh, which they reckon a delicious food, and for the hide and bones, which they convert to various purposes of ornamental device. In the class of *mammalia* they have also the rat; a small bat resembling the New-York bat of Pennant;[a] the sea-bear, or *Phoca ursina;* and the *Phoca leonina*, or leonine seal, called by Lord Anson the sea lion. There seems to be a large animal of the lizard kind, which, according to the reports of the natives, sometimes destroys children in the interior. New Zealand is the native place of some birds which are singular for the melody of their song, as well as for the gaiety of their plumage. One called the *poe* has beautiful tufts of white feathers, and a song more charming than that of the finest European species. There are a few species of the parrot kind, wild ducks, and a large black duck peculiar to the country. From the feathers found lining some of the garments of the chiefs, somewhat smaller than those of the *emu*, it is probable that there is also a species of the cassowary, though not hitherto seen by Europeans.[b] Several aquatic birds, and in general the same species of sea fowl which frequent other parts of the South Sea, such as the albatross and penguin, abound on the shores of New Zealand. Butterflies, beetles, common flies, and a few musquitoes, are among the insects, a class of animals which does not appear to be very abundant. There is a small sand-fly which proves troublesome by settling about the instep and ancles, and biting people while warm in bed. No poisonous serpents have been found. The coasts are visited by immense shoals of fish, and in great variety, making ample amends for the paucity of land animals. Those in common use among the natives are snappers, bream, the benicooto, the parrot-fish, herrings, flounders, and an inferior sort of salmon. Mackarel is also found, and lobsters; and there are beds of cockles, muscles, and other shell fish in some of the flats about the coves. The muscles are of immense size, and much relished by the natives.

The native inhabitants of New Zealand belong to the same race with the Otaheitans, the people of the Friendly Islands, and the other Polynesians. They have tawny complexions somewhat darker than the Spaniards; a few among them are fair. In their persons they are generally above the middle stature. Some are six feet or upwards, and their limbs are remarkable for perfect symmetry and great muscular strength. Their countenances are, with few exceptions, pleasing and intelligent, without those indications of ferocity which some of their actions would lead us to anticipate. We know but little of their diseases, except that they are liable to leprosy and visceral inflammations, and that opthalmia is very common among them.

The northern island is said to be divided into eight districts, governed by their respective chiefs, called *areekees* or kings, and other inferior chiefs, who, under the areekees, rule over smaller subdivisions. The power of the areekee is not absolute, and the inferior chiefs make frequent wars on one another without consulting him. In their political condition, as well as in some of their usages, these people bear a remarkable resemblance to the Battas in the island of Sumatra. Society is divided into two distinct ranks, the one consisting of the chiefs and all their kin, who are called *rungateedas*, and the common people, who are called *kookies*. The former are extremely tenacious of their dignity. They disdain several kinds of work, yet one of them was not ashamed to supplicate an English visitor with continued importunity to "give him a nail," after his request had been repeatedly complied with.[c] A chief, on board a British ship, will work like a common sailor, or will serve at table, or sweep the cabin, if he is assured that these labours are not derogatory to his dignity; because he has not yet learned the European feelings, and perhaps still more, because he is acute enough to see the superiority of the European character, and reasonable enough to recognize it in his actions, reserving h claims of rank for the society of his compatriots. It is a common thing for a chief to display his dignity in his village by sitting on the top of a house.[d] The kookies, however, though considered as far beneath the rungateedas, are treated with gentleness and attention.

The New Zealanders have some good domestic habits, and are not without ingenuity in a few arts. Having no metalic pots for boiling their food, they contrive to cook their fern root, and their potatoes, by means of two hollow stones, in which they first put their roots, surrounded by a few moist leaves of some well-flavoured plant, and then applying the hollow sides of the stones to one another, heat them thoroughly for a due length of time, at the end of which they are well stewed and palatable food. Of the fibres of the *Phormium tenax* they make a kind of cloth or matting, which they dye black with the bark of a tree called *Enou*. They make wooden vessels and spears, which last are neatly tipped with bone. They cultivate their fields with great neatness. Their canoes are made of boards, well joined and held together by strong osiers; some of them are fifty feet long. The large ones carry thirty men or more. They are often ornamented with a head, well carved and expressive of warlike ferocity. They are expert rowers, keeping time with beautiful exactness, not only in the same canoe, but through the whole of a small squadron. Their garments are made of matting and feathers. Some of them are worked with the utmost nicety. One of their finest cloaks requires more than a year to complete it. Their huts are constructed of sticks and reeds interwoven with each other, but in a manner so imperfect and insufficient as to have a wretched appearance; forming a great contrast to the neatness of the gardens. They have no windows, and the door is so low and narrow that they are obliged to squeeze themselves in and out in a crawling posture. The interior is sufficiently roomy, being fourteen feet long and eight broad.[e] From motives of superstition they make a point of eating only in the open air, or under a shed adjoining their habitation. Some of their villages are agreeably situated, and have a pleasing exterior. The hut of the chief is often larger than the rest, without being more convenient, or having a larger door. In some cases it is distinguished by

[a] Synopsis of Quadrupeds, No. 283.
[b] Nicholas, vol. II. p. 255.
[c] Nicholas.
[d] Idem.
[e] Nicholas, vol. I. p. 109.

posts with rude ornamental carvings. There is also a seat or throne for the chief or king. The villages are protected by strong pallisades, walls of wicker-work, embankments, and ditches. The store-houses, in which their provisions and arms are contained, are built with greater regard to method and neatness than their dwellings, having spacious doors, verandas, and orifices for admitting free air.[a] The natives of this country who have visited New Holland in the English ships, have beheld the natives of that continent with pity and contempt, for the abject lives which they lead,—their idleness, improvidence, and misery. Their dress consists of mats made from the *Phormium tenax*, often fancifully worked round with variegated borders, and decorated otherwise with curious art. These are fixed round the middle like the Scotch kilt. The chiefs are distinguished by wearing, over their shoulders, a cloak made of various furs, and shaped not unlike the Spanish cloak. The chiefs disfigure their whole countenances by tattooing them in a most hideous manner, of which no conception can be formed without the aid of such figures as are given in the works of Mr. Savage and Mr. Nicholas. They also besmear them with red ochre. They sometimes wear, as appendages to the ears, the teeth of the enemies whom they have slain in battle. Sometimes they hang from their breasts pieces of green jade, carved into rude representations of the human form. In their personal habits, however, they are dirty in the extreme, and from the highest to the lowest allow their bodies to swarm with vermin.[b]

In conversation the New Zealanders are animated, humorous, and witty. Towards their relations and children they are tenderly affectionate. When they see a relation after a long absence, for example, one who has been beyond seas, or even hear accounts of one still at a distance, they howl aloud with the keenest sensibility. Naturally spirited and ingenious, they are curious and ambitiously docile in matters of art. A chief who beheld the rope-making, and other manufactures of the English at Port Jackson, wept with mortification at the rude state of the arts in his own country. The labours of the field are chiefly devolved on the women. The fathers take the charge of the children ; they make excellent nurses, and fondle their infants with the liveliest tenderness and delight. Polygamy is practised. One wife is at the head of the establishment, the others rank as her inferiors and servants.

In religion the New Zealanders are moderate polytheists, their catalogue of divinities being less extravagant than that of many other barbarians. They believe in a supreme Deity—in a god of anger and death —a deity who makes land under the sea, and fastens it by a hook to a large rock ready to be hawled up—a god to hawl up the land : this last, at the same time, superintends human diseases, and gives life. They have also a god of tears and sorrow ; but their mythology is imperfectly known. They believe in the creation of man, and have a tradition of the first woman being formed of a rib taken from the man. They have a story of the moon having descended to the earth, and carried off a man who continues fixed on its surface. Their children, when born, are sprinkled with water by the Tohunga or priest ; a ceremony, without which they believe it would either be doomed to death, or grow up with a most perverse disposition. They are much in the habit of consecrating persons, places, and things, and call th spell thus imposed *taboo*. When a person labours under a severe malady, as soon as they believe that it is the intention of the god to deprive him of life, they place him under the *taboo*, deny him all food, and leave him to a necessary death, in compliance with the divine mandate. They inter the bodies of the dead with ceremonies which they do not allow Europeans to see. They believe that on the third day after the burial, the heart is separated from the body, and that the separation is announced by a gentle breeze to an Etooa, or inferior deity, who bends over the grave, and carries off the heart to the clouds.

Women often commit suicide by hanging themselves when their husbands die. The keen feelings of this people make them prone to suicide on various occasions of disappointment. A woman will hang herself immediately after receiving a beating from her husband.[c] The inhabitants of the Bay of Islands are said to be exempt from this malady.[d] The manners, no doubt, differ considerably in different tribes and places.

No other mode of reckoning periods of time has been observed among them, than by the changes of the moon, which they count up to 100, and by these epochs they calculate their age and the events that occur among them.

The New Zealanders live in a state of habitual warfare. The chiefs and tribes are respectively jealous of their rights, and go to war when these are slightly invaded. Sometimes, when the two hostile armies meet, a parley takes place, and peace is concluded. On such occasions a spirit of fairness and reason is manifested. It is not, in general, so much from predatory principles, as from high spirit and irritability, that their violent quarrels originate. Each tribe entreated Captain Cook to destroy its antagonists. Even when at peace they discover, in their intercourse with the English, a deep jealousy of each other ; envying any one whom they suppose more highly favoured than themselves, and continually labouring to excite prejudices against one another's characters and intentions. Their wars are conducted with the utmost ferocity. They have short spears, which they throw, like javelins, from a distance ; long ones, which they use as lances ; and broad, thick, sharp-edged tools, called *patoo patoo*, made of stone, about fourteen inches long, with which they strike one another in close combat, being able to cleave the skull by a single blow. Like the Battas, they devour the bodies of their enemies, and entertain the extravagant belief that the soul of a man thus devoured is doomed to eternal fire. It is purely from vengeance, and not at all from an appetite for human flesh, that they indulge in this shocking practice. They have committed some frightful massacres on their European visitors, but these

[a] See Mr. Nicholas's Description of the Town of Wyemattee, vol. I. p. 333—342.
[b] Nicholas's Narrative, vol. II. p. 223, 224.
[c] Collins, vol. I. p. 254. (in English.)
[d] Savage's Account, &c.

do not appear to have been so much instigated by cupidity, as by revenge for some affront or injury received. The unfortunate Marion had lived on terms of intimacy with the chief Tacoory, when the latter, under the pretext of giving him an entertainment, massacred him with all his attendants; and the French who came to revenge the outrage, saw the disgusting proofs of the savages having eaten and gnawed the palpitating limbs of those whom a few hours before they embraced with every demonstration of attachment. The English have suffered from similar acts of perfidy. The last was in the case of the ship Boyd, in 1809, the crew of which, to the number of seventy, was massacred by the chief named George, in revenge for some ill treatment received from the commander, Captain Thomson, who had brought him back as a passenger from Port Jackson, on condition of working his passage. The chief being taken sick, and unable to work to the Captain's satisfaction, was flogged and taunted by the latter, and, before being put on shore, was stripped of every thing English he had about him. Totally insensible to his own infamous conduct, the Captain went on shore, and left his ship unprotected, when the determined vengeance of the savages made a short and dreadful catastrophe in the annihilation of the whole crew, with the exception of four, one of whom was the cabin boy, who had paid some kind attention to the chief during the passage. The Captain of a vessel who afterwards came to the coast, left a written warning with one of the natives, to be shown to the commander of every ship which he might afterwards meet with, and in this document it was stated, from some mistake or misinformation, that a chief called Tippahee, who had formerly been well treated at Port Jackson, was the perpetrator. The crew of a whale ship who found this paper, inflicted a barbarous and misplaced vengeance, by murdering the whole people of Tippahee, who inhabited a small island, this chief himself and a few others having narrowly escaped in a boat. We are not altogether certain what affronts may, on other occasions, have incited these high minded and irritable people to acts of atrocious and perfidious cruelty. In their conduct they often evince sentiments of honourable integrity and fidelity, where reliance is placed on them by persons who have treated them well. The English sailors have been too much in the practice of teazing and insulting them, from a wantonness more degrading than their own excessive resentments, and they have invaded their property, and carried off their crops without scruple, as if no laws of honesty and delicacy were binding towards beings so strange and so different from themselves. The governor of New South Wales has very laudably taken the natives under his protection against all such lawless acts; the people begin to learn to make distinctions in the characters of Europeans, as well as among themselves, and to cultivate a good understanding, and to seek redress of occasional grievances, through the medium of the small missionary settlement which has been formed in their country. They certainly possess qualities which may prove a good foundation for the formation of a respectable character by instruction. A New Zealand mother will risk her own life for the sake of her child. Their songs and music are superior to those of the Otaheitans. Their songs are sung in parts, and the companies join in full chorus Their airs resemble the chantings of an English church. The inhabitants of East Cape are the bards of the country, by whom all their songs are composed. The subjects of them are generally taken from those scenes of violence with which the natives are so familiar, sometimes from the phenomena of storms, the business of rural cultivation, or other common exercises and enjoyments.

Snares Islands,[a] Lord Aukland's Group, and Macquarrie Island, to the south of New Zealand, show the continuation of the same chain of mountains, under water, by which that country is pervaded.

There is another well marked chain to the east of New Zealand, and nearly parallel to it, formed of the Bristol, Penantipodes, Bounty, and Chatham Islands. Chatham Island, which is the largest, was discovered by Broughton. It is about thirty-three miles[b] long. The surface has a gradual rise, so as to form pleasant looking hills in the interior. It seems to contain one of those lagoons which occur so frequently in the low islands of this ocean.

Vegetation, according to Broughton, is powerful in this island, but the trees are only of middling height. For a certain way up the trunk they are naked, and no brush-wood grows among them. There is one tree similar to the bay, and another jointed like the vine. The inhabitants were observed to use much thread and cord,[c] made of a fine hemp, which undoubtedly is of the growth of the island.

The inhabitants are of middling stature, stout and well proportioned. They have dark-brown complexions and expressive features. The hair of their heads and beards is black; no tattooing was observed about any part of their bodies. Their dress consisted of a seal skin, and a curiously wrought mat. The birds are of the same species which are seen at Dusky Bay in New Zealand, and were remarked to be, like them, wonderfully familiar, and not the least afraid of men, an evidence that they suffer no molestation.

Norfolk Island is situated to the north-west of New Zealand, nearly half way between it and New Caledonia. Here the English had at one time a flourishing colony, but it has been removed to Van Diemen's Island. Norfolk Island labours under the disadvantage of having no good harbour. It is about fourteen miles[d] in circumference. The coral reefs extend nearly twenty miles[e] in a southerly direction. The basis of this island consists of a yellowish chalk common to it with New Zealand. This is covered with a great thickness of black earth. Vegetation is vigorous and productive. New Zealand flax grows better than in its native country. The pine wood is heavier than that of New Caledonia, but softer than that of New Zealand.

[a] Properly a cluster called "The Snares."—P.
[b] "12 French leagues."
[c] "Filets et lignes," nets and lines.
[d] "5 French leagues."
[e] "7 French leagues."

Cabbage palms, wild sorrel, and sea fennel, are in great abundance. The English settlers introduced the grains and domestic animals of Europe.

Sailing farther north we find NEW CALEDONIA, a pretty large island, being 220 or 250 miles long and fifty broad.[a] But on the south and the west it is rendered dangerous of approach, by a formidable chain of reefs, extending 270 miles[b] beyond the island from the south-east to the north-west.[c]

New Caledonia seems to have a mountain chain extending through its whole length, becoming gradually higher towards the south-east, till it reaches an elevation of 3200 feet above the level of the sea. The principal rocks are quartz, mica, steatite of different degrees of hardness, green schorl, garnets, and specular iron ore. Basaltic pillars have been observed in some places. Its mountains contain, in all probability, rich metallic veins.

The bread-fruit tree of this island is very similar to that of the Polynesian islands. Beautiful avenues are formed of the cultivated banana.[d] Sugar cane and arum are also cultivated here. The sides of some of the valleys are covered with the cocoa tree. Among the other vegetable species are the tree called *Commersonia echinata*, which grows in great abundance in the Moluccas; the *Hibiscus tiliaceus*, the young shoots of which are chewed by the inhabitants; the *Dolichos tuberosus*, the roots of which are roasted and eaten; the *Diacophyllum verticillatum*, a new genus, allied to the dracæna, and which grows on the tops of the mountains;[e] the *hypoxis*, the roots of which are eaten by the New Caledonians, springs up spontaneously in the forests. The *antholoma*, one of the most beautiful of shrubs, grows on the high grounds. It forms a new genus of the natural order, *Guaiacanæ*.[f]

Even dogs and pigs were unknown in this island before the arrival of Europeans. The most common birds are a new species of magpie, large pigeons, and Caledonian ravens. A spider called *nookee* forms threads so strong as to offer a sensible resistance before breaking. The animal constitutes part of the people's food.

Among the moorings of the island we may mention Balade Haven and Deceitful Haven, where D'Entrecasteaux says he could not enter, but which the English navigator Kent, has described as a spacious and excellent port, situated behind the frightful chain of reefs which lines the west coast.

A travelling naturalist has lately found a singular correspondence in figure between the aborigines of Van Diemen's Island and those of New Caledonia. Their hair is nearly woolly, and the surface of their bodies greasy. Some have the thick lips of the African negro.[g] Light and nimble, they climb trees with as much facility as they walk along level ground. Cook praises the mildness of their character, and the chastity of their females.[h] D'Entrecasteaux and Labillardière describe them as equally cruel, perfidious, and thievish, with the other islanders of the Great Ocean.[i] The women were hired for a nail, and the size of the nail was in proportion to the beauty of the person. Ignorant of the use of the bow, they are armed with darts and clubs, which they manufacture with much pains; they also make use of slings. It turns out, on recent and attentive observation, that they are cannibals from taste. They tasted with an air of luxurious pleasure the muscular parts of the human body, and ate a slice of the flesh of a child.[k] Their common food consists of shell-fish, and other fish, with roots. They also eat the spider already mentioned, and the greenish mealy soap-stone. The only dress of the females is a girdle of fibrous bark; several of the men encircle their heads with a fillet of net work, or a head dress made of leaves, and the hair of the vampire bat. They build walls on the mountains, to confine the soil, in the same manner as is done in so many countries, forming the arable surface into a succession of terraces. Yet the soil is generally poor. Their houses are in the form of bee-hives, and the doors are of carved planks. Their harsh and croaking language seems to be totally different from that of Polynesia.

The Isle of Pines, on the south of New Caledonia, produces stately cedars,[l] the trunks of which furnish columns exceeding one hundred feet in height. The Loyalty and Beaupré Islands form a little archipelago to the east. The great reefs by which New Caledonia is skirted on the west, and which extend 250 miles[m] in a northerly direction, present the navigator with the prospect of inevitable ruin, in case the winds and currents should carry him among them. All the way between this island and New Holland the sea abounds with coral banks, some of which are larger and more dangerous than others.[n] Captain Flinders, who was shipwrecked on one of them, is of opinion that the two frigates of La Perouse met their fate on one of these banks.

To the north and east of New Caledonia we have an important archipelago, for the extent and fertility of the islands of which it is composed. Fernandez de Quiros, who discovered the main land in 1606, gave it the name of Australia del Espiritu Santo. A hundred and sixty-two years after this, M. de Bougainville added to it some islands, to which he gave the elegant name of the Great Cyclades. After an interval of six years, came Captain Cook, and completed the discovery of the leading islands. Following the principle of a submarine chain of mountains, he seems to have reached its southern extremity. Captain Bligh found a continuation to the north, consisting of islands which were probably seen by Quiros. Captain Cook proposed to give this archipelago, as a whole, the name of the New Hebrides, a proposal strongly objected to by Fleurieu, who wished to retain a memorial of the first discovery in

[a] "80 to 90 by 18 to 20 Fr. leagues."
[b] "100 Fr. leagues."
[c] Labillardière, Voyage à la Recherche de La Pérouse, I. 199, &c.
[d] Idem, vol. II. p. 36. Atlas, pl. 41.
[e] Forster, Voyage, t. II. p. 327.
[f] Idem, ibid. p. 240, and Atlas, pl 12.
[g] Labillardière, Voyage, II. p. 186, Forster, Voyage, II. p. 802.
[h] Cook's Second Voyage.
[i] Rossel, Voyage de D'Entrecasteaux, II. p. 351, &c.
[k] Labillardière, Voyage, II. p. 193—201, &c.
[l] "Cyprès," Norfolk pine.
[m] "90 to 100 Fr. leagues."
[n] Flinders, Annales des Voyages, t. X. p. 88.

the original name of the Archipelago, that of the Holy Ghost.[a b]

The most southerly group of this archipelago is detached from the rest of the chain, and consists of five islands, which, with the exception of Immer, are high, and have no coral reefs. Tanna, the only one which has been minutely examined, contains a very active volcano. Messrs. Forster and Sparrmann made an unsuccessful attempt to reach that burning mountain, which is not one of the highest on the island. The volcano itself shook, and the ashes which it spouted forth darkened the atmosphere. The rain, which fell at the time, was a heterogeneous mixture of water, sand, and earth, and might be called a shower of mud.[c] These subterranean fires seem to contribute much to that exuberance of vegetation by which the island is distinguished. Several plants attain here twice the height that they have in other countries, broader leaves, and a stronger perfume. In several places sulphurous vapours are exhaled. In others, the springs are tepid. Tanna has also strata of clay and aluminous earth, with blocks of chalk and of tripoli. It abounds in sulphur, and affords traces of copper. The scenery of Tanna is pleasanter and more elegant than that of Otaheite, as the mountains do not shoot up abruptly from the middle of a narrow plain, but are preceded by several ranges of hills separated from one another by wide valleys. Here are found bananas, sugar canes, sweet potatoes, and several sorts of fruit trees. The English found here the pigeon which transports the seeds of the nutmeg in the Moluccа Islands. In the crop of one of them, an oblong nutmeg was found. The natives showed them specimens of that fruit still surrounded by the mace. It cannot, therefore, be doubted that a variety of the nutmeg grows on these islands, though none were found within the narrow limits which the English were allowed to traverse.[d]

The natives resemble the people of New Holland more than those of the Friendly Islands. They are of a brownish-black colour, of moderate stature, but muscular and vigorous. Their beards are strong, black, and curled. The hair of their heads is thick and bristly; their features are expressive and open; and every thing about them has a masculine and warrior-like air. The singularity of their ornaments, the little peg with which the tip of the nose is pierced, the cloth which they wear round their loins, in such a style as rather to outrage decency than to preserve it, and the use of a coarse pigment made of ochre and chalk, are so many marks of an affinity to the natives of New Caledonia, New Guinea, and Solomon's Archipelago. On the other hand, these islanders seem to have derived their arts from the same origin with the Polynesians. Their bows, made of the best elastic wood, their slings, their clubs, and their darts, with which they can pierce a plank four inches thick, often remind one of the arms used in the Friendly Islands. The language of Tanna, and that of Erromango, to the north of it, are different; and neither of them has any resemblance to the general language of Polynesia.[e]

The women of the New Hebrides, being treated as slaves, soon lose the few attractions which nature has conferred upon them. They are weak and puny. Several of the young girls, according to Dr. Forster, had pleasant features, and a smile which became more pleasing in proportion as their timidity was dissipated. They had handsome forms, delicately turned arms, and full and round bosoms; their clothing reached to the knees. Their curled hair waved loosely on their heads, or was fastened in a tress; and the green banana leaf, which they generally wore in their hair, formed a handsome contrast with its blackness. They repelled with modesty the advances of the seamen.

Cook also discovered Sandwich Island, which is about seventy miles[f] in circumference, and has an aspect equally fertile as the preceding. The woods were adorned with tints of lively verdure, and contained a profusion of cocoa-trees. The mountains have a considerable elevation in the interior, and exhibit, at their feet, many lower districts covered with wood, intermingled with cultivated fields arrayed in the same golden tints with the corn fields of Europe. It was considered as a very promising island for colonization.

The islands of Api and Paoom were not minutely examined. Ambrym attracted attention by a volcano in it, which impetuously emitted columns of whitish smoke. It seemed to be fruitful and well cultivated.[g]

In Whitsuntide Island[h] several plantations were seen, and many fires. The more majestic island of Aurora is adorned with picturesque forests, diversified by fine water-falls. The unpleasant name of Leper's Island, given by Bougainville to a small one in this neighbourhood, is not founded on any peculiarity attached to it. A white leprosy exists in every part of Oceanica.

The two large islands of Mallicolo and Espiritu Santo form a separate chain, lying more westerly than that which we have now traced.

The natives described Mallicolo to Quiros as a great country, although it does not exceed fifty miles[i] in length. The Spaniards called it Manicola. It is well wooded and well watered, and appears to possess a fertile soil. Pigs and poultry were the only domestic animals. Cook enriched it with the addition of the dog.

The people of Mallicolo might, from their looks, almost be regarded as a kind of apes. Their appearance is hideous, and altogether different from that of the neighbouring nations. The men are brown coloured: their general height does not exceed five feet four inches: their limbs are, in many instances, ill proportioned: the arms and legs are long and slender, the head lengthened, and the countenance flattened. To these characters are to be added a broad flat nose, projecting cheek-bones, the forehead narrow and compressed backwards, as it is in the lower animals. Their hair is curled, but not woolly like that of the African negro.[k]

This race exactly coincides in character with the

[a] Voyage de Marchand, tom. V.

[b] "Who proposed to preserve a memorial of the first discovery by naming it the archipelago of the Holy Ghost, (*archipel du Saint Esprit.*)"—M. B.

[c] Forster's Voyage. II. p. 212.

[d] Cook's Second Voyage, Book III. ch. 4—6. Forster, II. 262.

[e] Forster's Voyage, II. p. 225.

[f] "25 Fr. leagues."

[g] Cook's Second Voyage, III. p. 241. Forster's Voyage, II. p. 180.

[h] "Ile Pentecôte."

[i] "18 Fr. leagues."

[k] Forster's Observations, p. 240. Ditto, Voyage, II. p. 182.

monkey-looking tribe which Capt. Flinders found at Glasshouse Bay. Their dialect contains those hissing and clucking sounds, and those strange combinations of consonants which occur in the African idioms, setting the organs of Europeans at complete defiance. Russian and German words they pronounce easily. The girdle which they wear round the body, being tight drawn, gives them the appearance of gigantic ants, while the cloth wrapped close under for the sake of decency, produces an opposite effect. They use poisoned arrows, by which speedy death is inflicted on the wounded. It is the mark of weakness to have recourse to treachery.

Terra del Espiritu Santo, the largest and most westerly of the whole archipelago, is sixty miles long, thirty-three broad, and more than a hundred and sixty in circumference.[a] The shores, especially on the west side, are uncommonly high, forming a continued chain of mountains, which, in some places, rise directly from the margin of the sea. But in general the island is bordered by beautiful wooded hills, open valleys, and varied plantations. The islands which lie along the southern and eastern coasts probably form bays and harbours equally well sheltered with the great bay of St. James and St. Philip, which is on the east side. Here Quiros and Cook anchored, in the harbour of Vera Cruz, near the river Jordan. The worthy Spaniard wished to found, in this place, the city of New Jerusalem; but, before the first hut was finished, a bloody contest with the natives, and a failure of provisions, obliged him to return to America.[b]

The inhabitants, more handsome and more vigorous than those of Mallicolo, are black, and their hair is either woolly or much curled. Some of their words are the same that are spoken in the Friendly and Society Islands. Quiros saw here men of different colours; some mulattos, some blacks, and some white, with red hair. These last were probably inhabitants of the island of Erromango.[c] Forster justly laments the hurry with which this country was surveyed. This was increased by an unlucky occurrence. In leaving Mallicolo a fish had been taken which seems to have been a *Sparus erythrinus*. All who ate of it were seized with gripes, acute pains, and vertigo. Their bodies were covered with phlegmons, and they were affected with a deadly languor. A dog and a pig, however, were the only individuals to whom it proved fatal. Quiros met with the same accident. Some future navigator examining this island with greater leisure, will perhaps find in it the orange-tree, the aloe, the nutmeg, the pepper-plant, the ebony, the citron, pearls, and other valued productions, or even the precious metals mentioned by Quiros.

This navigator, however, writes with much candour; he only extols the rich and varied vegetation, the beautiful forests, free from the incumbrance of trailing shrubs, and the fresh and salubrious waters.[d] If, in his Fifty Memoirs presented to the court of Spain, the silver mines figured as a conspicuous article, this was a harmless artifice, intended to produce, in the gross minds of the great, an interest in his noble discoveries.

Ten or twelve islands remain to be found again, which were discovered by Quiros, after quitting the island of Taumaco, and before arriving at Terra del Espiritu Santo. But it is not easy to convert his vague calculations of longitude into actual degrees. The discussion of the different explanations of them which have been given, and which might be given, would require a long memoir, or rather a monographic treatise. If Rotumah Island is Taumaco, the islands of Tucopia, San Marcos, Vergel, and others, will correspond tolerably well to Pandora, Cherry, and Barvel islands, and Banks's Group, lately discovered by Captain Edwards, on the north-east of Terra del Espiritu Santo.[e] The description of Pitt's Island, which is high and wooded, corresponds to that of the "Gate of Belen." Coming south to 14° 30′ of latitude, Quiros discovered an island which he called Nuestra Señora da Luz; and, immediately after, he saw to the south, the south-east, and the west, several high and extensive lands, in one of which he discovered the Bay of St. Philip and St. James.[f] We can easily see the position in which every navigator must find himself, who, after having passed the Pic de l'Etoile, enters the channel surrounded on the one hand by the islands of Terra del Espiritu Santo and Mallicolo, and on the other, by Aurora and Whitsuntide islands. Another account, which says nothing of Nuestra Señora, or Pic de l'Etoile, makes up for the defect by an express proof that the Great Cyclades of Bougainville had been seen and named by this navigator; for he found at seventeen degrees of latitude, and only seven leagues from Terra del Espiritu Santo, the two islands of Cordova and Clementina, which seem to be the same as Aurora and Whitsuntide Islands.[g] In short, the island of Belen, and that which is called the Pillar of Saragossa, towards which the north-east wind drove the fleet, after leaving the Bay of St. Philip, must belong to a chain which connects the New Hebrides with Solomon's Islands.

We now come to a country, the discovery of which, in its different parts, has afforded much exercise to the patience of navigators. The only description that can be given of Solomon's Islands, and the archipelago of Santa Cruz, is a history of the attempts made to explore and examine them.

The Spanish navigator Mendana, who was sent out to discover Terra Australis, found, in 1568, a series of islands which he called Ylas de Salomon, which he placed between the fifth and the ninth degrees of south latitude; but his observations of the longitude were so vague and inaccurate, that neither he himself nor any other navigator, for a long time after, could succeed in finding these islands. He seems to have believed, from the estimates which he made, that he was 1450 marine leagues from Lima. But the Spaniards wished to conceal the discovery, for fear of inducing other nations to form settlements in these countries; and their authors, either in obedience to orders or from ignorance, placed these islands sometimes 800 and sometimes 1500 leagues

[a] "22 Fr. leagues long, 12 broad, and more than 60 in circumference."
[b] Quiros's Account, written by himself, in the Viajero Universal, t. XXVII. p. 197.
[c] Forster's Voyage, II. p. 201.
[d] Quiros, in the Viajero Universal t. XXVII. p. 203.
[e] Burney's History of Discoveries, II. p. 326.
[f] Account of Quiros, according to Figueroa, in Dalrymple, I. p. 131.
[g] Quiros, in the Viajero Universal, XXVII. 190.

west from Peru.[a] Mendana gave the name of Isabella to the largest island, lying south-east and north-west. Guadalcanal is a long island, situated to the south of the preceding, and behind some small islands, among which is Sesarga, which contains a volcano. The most southerly land found here was called the island of Christoval. The whole of this archipelago was peopled by negroes, armed with arrows and lances; they dyed their hair red, and ate, with high relish, the flesh of their own species.[b] No evidence is given of Mendana's having found any indications of the precious metals. Solomon's name was placed in the foreground merely to tempt the avarice of the Spanish government.

In a second voyage, Mendana, after searching in vain for Solomon's Islands, discovered the island of Santa Cruz, and a few others. These were Egmont Island, and some others belonging to Queen Charlotte's group, which were again found by Captain Carteret.

The attempt of the Spaniards to form a settlement did not succeed. Mendana's widow brought back to the Philippine Islands the remains of the colony which had escaped the ravages of disease and the hostile attacks of the natives.

Carteret landed on the Island of Santa Cruz, where he was obliged to maintain a bloody contest with the inhabitants. Here the English had been received and entertained in a house of assembly similar in its form and accommodations to those used in Otaheite.[c] The natives were black, though not of the very deepest tint. One of them, who was taken prisoner, had woolly hair, but regular features. These people, brave and vigorous, resolutely defended their island, which is fertile, well wooded, and lined with large villages. Carteret acknowledged the priority of discovery by the Spaniards, yet presumed to name the group Queen Charlotte's Islands. Even Swallow Island, which has not been found by any subsequent navigator in the situation pointed out by this Englishman, must be that of San Francisco, which was seen by Mendana. It corresponds to it, at least in latitude and in physical features.[d]

D'Entrecasteaux and Labillardière have given us an excellent description of the archipelago of Santa Cruz. Trevannion Bay is the most remarkable harbour of the large island. The mountains, which are not high, seem to be calcareous. The inhabitants are olive-coloured, and in features resemble those of the Moluccas; but some of them are black, and seem to belong to a totally distinct race. The latter have thick lips, and broad flat noses; but all of them have crisped hair, and broad foreheads.[e] They pluck the hair off every part of the body, and delight in wearing white hair, which they produce by means of lime, in the same way as is done in the Friendly Islands. This colour forms a strange contrast with the darkness of their skin, which is increased by tattooing.

Solomon's Islands were first re-discovered by Surville, a French navigator, who called them the Arsacides Islands.[f g] He followed the chain from north-west to south-east. He discovered, on the north side, Port Praslin, Contrariety Island, Deliverance Islands, and the eastern extremity of all these countries called Surville Cape, or Surville Islands. The inhabitants manifested a perfidious and bloody disposition, on which account he compared them to the famous Assassins (erroneously called by him Arsacides) of Persia and Syria. They had black complexions, woolly hair, flattened noses, and thick lips. They powdered themselves with lime, wore bracelets of shells, and girdles of human teeth. Nosegays were hung from their perforated noses. Their light boats were pitched with mastic. Surville noticed a diversity of tribes which spoke different languages. The government appears to be despotic in the extreme. The fishermen and cultivators are obliged to offer the king the whole produce of their labour, and he retains as much of it as he chooses. A subject who presumes to walk in the shadow of the king is punished with death. The sculptures with which they adorn their war boats are master-pieces of elegance. Some of these are fifty or sixty feet long. Their arms are far from being contemptible, especially their powerful elastic bows.[h]

A year before Surville's voyage,[i] another French navigator, M. de Bougainville, leaving successively the New Hebrides or Great Cyclades, and the islands of Louisiade, found a passage through the northern part of Solomon's Archipelago. He discovered Bougainville and Booka islands. The strait by which these are divided from the islands visited by Mendana and Surville, received the name of "Bougainville's Strait." This navigator was here in great want of provisions. He observed among the inhabitants of Choiseul Bay evident traces of cannibalism.[k]

The south-west coast of this archipelago remained to be examined. It was visited in 1783 by an English navigator, Mr. Shortland, who took this series of islands for one continued country, which he thought proper to call New Georgia. From what he heard, he was led to believe that the natives called it *Simbu*. The great mountain, which he called Mount Lammas, is situated in Mendana's Island of Guadalcanal. The strait to which he gave his own name is the same through which Bougainville had passed. But he observed the "Treasury Islands," which had escaped the rapid researches of the French navigator.[l]

D'Entrecasteaux has thrown considerable light on the geography of this archipelago. He examined the southern coasts of San Christoval and Guadalcanal; verified the points seen by Shortland; and determined with greater accuracy the position of the islands discovered by Bougainville. The atlas accompanying his account points out discoveries, the authors of which are not mentioned, but which appear from their names to belong to the English.

[a] Dalrymple's Historical Collection, I. p. 43.
[b] Figueroa, in the Viajero Universal, vol. XXVII. No. 273.
[c] Voyage de Carteret, chap. IV. et V.
[d] Viajero Univ. p. 62. Comp. Découvertes des Français au sud-est de la Nouv. Guinée, en 1768 et 1769, Fleurieu, p. 233.
[e] Labillardière, vol. II. p. 255.
[f] Fleurieu, Découvertes des Français, p. 120. 287, &c.
[g] "Terres Arsacides."
[h] Fleurieu, Découvertes des Français, p. 136. 145, &c.
[i] A year after, says the translator; but this is erroneous. I have followed the original, which is supported by the facts. Bougainville sailed through the Pacific in 1778. Surville's discovery was in 1779. See Pinkerton, vol. II. p. 143, 4to.—P.
[k] Bougainville, Voyage Autour du Monde, p. 269.
[l] Bratring, Memoir on the Discovery of New Georgia, the Arsacides Islands, &c. &c. in the Ephemerides Geographicæ of Bernuch.

To sum up the detached notions obtained by these navigators, Solomon's Archipelago consists of the following islands from south to north: San Christoval, near to which are the Santa Anna, and Santa Catalina of Mendana, and the Island of Contrarieties of Surville; Guadalcanal, separated by a strait from Santa Isabella, the largest of the whole archipelago; to the east of the strait are Carteret and Simpson's Islands, which must correspond to the Buenavista and Florida of Mendana. To the south of these, according to the Spanish navigator, are San Dimas, San German, Guadelupe, and Sesarga. The large island of Isabella is separated by a long channel, to which no name is given, from the islands seen by Shortland, and which form a chain to the west of it. Cape Marsh Island is small; but that which Shortland thought he heard the natives calling Simboo appears to be large, and is probably the Malayta of Mendana. To the north of it is an island which has no name, and which contains Choiseul Bay. Crossing Bougainville's Strait we come to the Treasury Islands, and those of Bougainville and Booka.

According to Labillardière, the naturalist belonging to D'Entrecasteaux's expedition, the Solomon Islands are surrounded by reefs and coral banks, which, like those of New Caledonia, render the navigation very dangerous. They have a fertile aspect, and present delicious landscapes. The whole surface to the very tops of the mountains is shaded by trees.[a]

The island of Booka is very populous. The inhabitants are of middling stature, with black complexions, but not of the deepest tint. They go entirely naked. Their muscles are well marked, indicating great strength. Their figures are ugly but expressive. Their heads are large; the forehead and whole face is broad and flat, especially below the nose. The chin is thick, the cheeks rather prominent, the nose flattened, the mouth large, but the lips thin. They pluck out the hair from every part of the body. They bestow industrious pains on the making of their bows; their arrows are tipped with the spine of the sting-ray,[b] and they are skilful in the use of their weapons. Their boats are elegantly formed, and adorned with carved work.[c] In the Island of Contrarieties some of the words used by the natives belong to the Malay or Polynesian language.

Solomon's Islands seem to be very fertile. Among their vegetable productions the old navigators mention cloves, coffee, ginger, a kind of citron, and many resinous trees, which afford an odorous aromatic exudation. The bread-fruit tree and the fan-leaved palm abound in them. Plenty of poultry were seen; the dog and pig seem to be known; the forests are peopled by elegant paroquets. They harbour serpents, toads which have a crest on the back, long spiders, and large ants.[c] A little gold and some pearls were found by Mendana, which seem to have given origin to the extravagant ideas which several Spanish writers have formed of the treasures of this modern Ophir.[d]

Hunter, Pitt, and Bellona Islands, situated to the south-west of San Christoval, form a separate archipelago.

To the north-east of Solomon's Islands there seems to be a chain of low islets, surrounded by reefs, which is probably not fully known. Captain Hunter has lately determined Stewart's Islands, Bradley's Shallows, and Lord Howe's Group. Bradley's Shallows are thought to be the same to which Mendana gave the name of "Baxos de la Candelaria;"[e] perhaps they are only a continuation of them. This chain of low islands probably joins the group to which Abel Tasman gave the name of Ontong-Java, and which the Spanish navigator, Maurelle, believed he had re-discovered. These islands have the appearance of groves of palms connected by shallows. The Great Ocean has numerous groups of this kind, the extent and precise number of which it will long be difficult to ascertain. We proceed, therefore, to more important objects.

Between Solomon's Islands and New Guinea we find two important archipelagos. That of Louisiade, to the south-west of New Guinea, was discovered by Bougainville, who visited in a particular manner the bay called "Orangery Harbour."[f] M. D'Entrecasteaux, who visited these countries on the north-side, gave names to the islands of Rossel, Saint-Aignan, D'Entrecasteaux, and Trobriand. The whole of Louisiade is a chain of islands surrounded by rocks and reefs. It appears to be very populous. The inhabitants go naked, and are almost black. Their woolly hair is decked with tufts of feathers. Some among them are as black as the negroes of Mozambique. Like them they have the upper lip greatly projecting beyond the lower. These must be distinct races. The inhabitants of Louisiade do not understand the Malay language; their huts are built like those of the Papuas. They wear a buckler on the left arm, a piece of armour not common among the savages of this part of the world. Their axes are made of serpentine stone. They are wonderfully expert at sailing near the wind.[g] They manufacture fishing lines.[h] They are very fond of sweet smells, and perfume the greater part of the objects which they make use of.

The perfumes which were exhaled along the coast,[i] created a belief that aromatic trees, particularly the culilaban bay, grew in this country. The cocoa tree, the banana, and the betel, were seen.

We must take notice of the hypothesis of M. de Fleurieu, according to which, the northern coasts of Louisiade are the same that were discovered by the Dutch vessel Geelvink, in 1705, though neither their longitude nor latitude were determined.[k] But this hypothesis is superseded, since we have become acquainted with a large bay in the north of New Guinea, which seems to suit the description of that which was visited by the Geelvink.

The archipelago of New Britain, long confounded with New Guinea, is separated from that country by Dampier's Strait. Before this separation was known, Lemaire and Abel Tasman had coasted a part of the

[a] Labillardière, I. p. 229.
[b] "Raie pastenague."
[c] Surville, in Fleurieu.
[d] Burney, Hist. des Dècouv. p. 283—287.
[e] Spanish,—Candlemas Shallows.
[f] "Cul de sac de l'Orangerie."
[g] Labillardière, tom. I. p. 275. Rossel, D'Entrecasteaux.
[h] "Filets," nets.
[i] Bougainville, Voyage, p. 258. Labillardière, tom. II. p. 281.
[k] Desbrosses, Hist. des Navigat. aux Terres Australes, I. p. 444.

archipelago, and particularly New Ireland. Even before their time, the Spaniards, in their first voyages to New Guinea, had found the large island called Dagoa, the figure of which, in Debry's Chart, published at Frankfort in 1596, resembles that which was given to New Britain[a] before Carteret's voyage; but these old discoveries remain enveloped in deep obscurity. Dampier was the first who informed us that this mass of land was separated from New Guinea. Carteret, soon after this, discovered St. George's Channel, and separated from New Britain the island which he named New Ireland. He also examined New Hanover and the Admiralty Islands to the west of it. D'Entrecasteaux contracted the circumference of these lands, which had been too much rounded off, especially by his examination of the north coast of New Britain, where he discovered the French Islands and Willaumez Islands. The supposed eastern extremity of New Britain was found to form a separate island, and there were strong grounds of doubt whether the remaining part was one single island.[b]

The nature of the soil and the character of the inhabitants, resemble those of the neighbouring countries which we have just described. Dampier, who stopped chiefly in a bay belonging to New Britain, called Port Montague, found the country mountainous and woody, containing fertile valleys and large rivers. It appeared to him to be very populous. The natives resembled those of Papua, and managed their canoes with the nicest skill. The principal production appeared to be the cocoa tree. There were also found a number of esculent roots, particularly ginger, several kinds of aloes, rattans, and bamboos.[c] The birds and the insects were in great numbers. Dogs, or some similar animals, were believed to be observed. The sea and the rivers swarmed with fish. In the main land, and the adjoining islands, there are many volcanoes.[e] New Britain presented to D'Entrecasteaux evidences of a very crowded population. The huts of the inhabitants were raised on posts like those of the Papuans.[d]

Captain Carteret found the inhabitants of New Ireland a very warlike people. They carry spears armed with sharpened pebbles. Their faces are besmeared with white paint, and their hair covered with white powder; a characteristic trait of all these nations. They are black; their hair is woolly and curled, but they have neither the thick lips nor the flat noses of negroes. Some of the canoes of New Ireland are ninety feet long, and are made of a single tree.

Bougainville observed here the pepper vine; but it is to Labillardière that we are indebted for the most extended accounts.

In the neighbourhood of Carteret harbour, in New Ireland, there are some steep mountains, containing on their sides remains of marine bodies, of which they are partly composed. Some of them in the interior seem to be upwards of 8000 feet above the level of the sea, and are covered with tall trees to their summits. The hollows of the rocks harbour the large bat called *Vespertilio vampyrus*. The bread-fruit tree is found here, and the cubeb pepper, which grows amidst the shade of the forests.[e] There are many scorpions and *Scolopendra*.

The little island of Cocoas,[f] in this vicinity, is entirely calcareous. It contains a much greater number of fig-trees than of cocoas. The *Barringtonia speciosa*, the *Pandanus*, the *Heritiera*, attracted by the humidity, wave their magnificent branches over the surface of the sea.[g] There is also a new species of areca palm, which is 140 feet in height. Its trunk is extremely slender, but the wood is very hard. There is a very large tree belonging to the genus *Solanum*. Teak and gum trees are common. In the marshes is found the useful sago palm, a valuable resource for a future colony. In the west part there is the species of nutmeg, described by Rumphius under the name of *Myristica mas*.

The small island called the Duke of York's, in St. George's Channel, appeared to Captain Hunter a large garden, its plantations were so regular and so near together. The inhabitants brought fruits, which they piled up in pyramidal heaps, on the top of which they placed little dogs with their feet tied; they sung hymns of peace to the sound of a large shell; but amidst these demonstrations, the result of their fears, the spirit of defiance and ferocity which they cherished was sufficiently apparent.[h]

To the north-west of New Ireland is another pretty large island, though little known, called New Hanover, separated from the preceding by a channel much obstructed with reefs, and shut up, at its entrance, by small islets.

Among the small islands, which form a chain to the east of New Ireland, we shall notice that of Garrit-Denis, or rather Gerard de Nys. The inhabitants resemble those of the main land; they wear little pegs stuck through holes in their noses.[i]

Turning westward, in the direction of New Guinea, we meet with a series of archipelagos; among which are the Portland Islands, the Admiralty Islands, Hermits' Islands, and Exchequer Islands. Each of them has a large island in the centre of the group, and round which the outline is formed by a great number of flat islets, connected together by reefs. In the archipelago of the Admiralty Islands the islanders have black complexions, though not of the deepest kind; their physiognomy is agreeable, and, in its oval form, differs little from the European character. Their figures are excellent, if the plates published by voyagers are worthy of credit. The chiefs seem to be possessed of great authority; some persons among them were armed with darts pointed with volcanic glass. The only covering which the men wear is a shell[k] fixed in front, for the protection of decency. The women wear a garment round the middle. Their hair is curled and black. They sometimes paint it red with ochre mixed up with oil.[l]

The Hermits' Archipelago[m] produces several species

[a] Dalrymple's Hist. Coll. I. p. 16.
[b] Zimmerman, Australien, I. 328.
[c] Dampier, Voyages, t. V. p. 120.
[d] Labillardière, tom. II. p. 285.
[e] Labillardière, tom. I. p. 241.
[f] "Ile de Cocos," Cocos Island.
[g] Labillardière, tom. I. p. 233, &c.
[h] Hunter's Journal, p. 141.
[i] Dampier, V. p. 101.
[k] *Bulla ovum.*
[l] Labillardière, t. II. p. 251.
[m] The Anchorites.—Pinkerton.

of *Eugenia*, which bear excellent fruit. The inhabitants seem stronger, yet gentler and more peaceful, than those of the Admiralty Islands.

A country of greater importance now claims our attention. New Guinea is the great link by which the Molucca Islands are connected with New Holland on the one hand, and the Polynesian Archipelagos on the other. It may, probably, have served as a medium of communication to the inhabitants, and even to the animals and plants, of different parts of Oceanica. It must participate in some of the characters both of New Holland and the Malay Islands; but, unfortunately, we know nothing of it beyond the line of coast, and even of this line our knowledge is imperfect.

The west part is best known, and there seems to be now no room for supposing that there is any strait, by which this country is divided into two. But of the whole south coast, especially from Cape Valsch[a] to Cape Rodney, our knowledge is only partial, or derived from old charts, which are not to be depended on.

Macluer's Gulf, penetrating deep into the country in the north part of the west coast, forms a circular peninsula, in which the Cape of Good Hope and Dory Harbour are situated. The great Bay of Geelvink, penetrating from north to south, to a depth of 190 miles,[b] produces another isthmus and another peninsula. At the entrance of this gulf are situated Schouten Island, Jobie, and some others, which were long taken for a part of the coast of New Guinea. The remainder of the north coast, discovered by the Spaniards, Menezes and Saavedra, visited by Lemaire, Schouten, and Tasman, and by Dampier, Carteret, and Bougainville, seems to be one even uninterrupted line, parallel to which is a long chain of islands. On examination, however, it is found to have large interruptions.[c] From King William's Cape to South-east Cape the east coast was seen by D'Entrecasteaux, but only at a distance. It is not certain whether Cape Rodney, discovered by Edwards, forms part of the continent; of which, in that case, it will be the southern extremity.

In fine, the delineations of the great gulf between Cape Valsch and the Arroo Islands are various and inconsistent. At the bottom of this gulf, the Dutch place the river of Assassins, and another which they call Keerveer, or "Return."[d]

Supposing that New Guinea extends, without interruption, from Cape Blanc[e] (also called the Cape of Good Hope) to Cape Rodney, its length must be about 1200 miles,[f] and its breadth will vary from 15 to 360.[g]

Torres Strait, on the south, separates New Guinea from New Holland, and Dampier's Strait from New Britain.

This country is often called Papua, or the country of the Papoos or Papuas, from the name by which the inhabitants are known among the Malays.

The coasts of New Guinea are generally high. In the interior, mountains are seen towering over one another. There are cataracts, the foaming waters of which are visible at a distance of many leagues. In the western peninsula, the mountain Arfook[h] seems to reach higher than the clouds. The Dutch charts lay down to the north-east of the Arroo islands a mountain covered with snow, which must be nearly 20,000 feet high. The mountains on the coast are richly clothed with trees. The shores are covered with cocoa trees. Navigators have been universally struck with astonishment at the sight of so fine a country, which deserves to possess a more industrious and civilized race of inhabitants.

Captain Forrest, who only visited Dory harbour, found many nutmeg trees in some small islands; and we have reason to think that the main land is not destitute of the same productions. An aromatic bark, called *massoy*, is exported in large quantity.[i] It seems to be the produce of a sort of laurel. The Dutch found in this country iron-wood, ebony, canary-wood, lingoa, and the grape-formed nutmeg.[k] The sea throws out large lumps of ambergris. Beautiful pearls are found in it.

Hogs abound on the sea-coast, and wild boars in the forests; but perhaps the animal called the wild boar is the barbyrossa of the Moluccas.

The ornithology of this country is curious and even romantic. It is the favourite residence of the superb and singular birds of paradise, of which there are ten or twelve species. That kind which is called "The King" has two detached feathers, parallel to the tail, which end in an elegant curl, with a tuft. The species called "The Magnificent" has also two detached feathers of the same length with the body, very slender, and ending in a tuft. The species called "Golden Throat" has three long and straight feathers proceeding from each side of the head. All the birds of paradise are arrayed in brilliant colours. They are chiefly caught in the Arroo Islands. They are shot with blunted arrows, or caught with bird-lime, or with gins. After being dried by means of smoke and sulphur, they are sold for nails or pieces of iron, and carried to Banda. This country also contains beautiful parrots and loris. The goora carries a sort of crown, or rather a crest of long plumes, arranged over the head. White pigeons and copper-coloured ring-doves live here on the nutmegs of the country.

New Guinea seems to be peopled with a diversity of human tribes. The Badjoos of Borneo, and the Malays of the Moluccas, extend their cruises over the whole of the western coast. Several of them must have naturally settled in that quarter. In the interior there is a race of Haraforas, who live in the hollows of trees, on which they climb, by means of a notched piece of wood, which they drag up after them, for fear of any surprise.

The great mass of the inhabitants seems to consist of real Oceanian negroes. Their bodies are stout, tall, jet

[a] Cap Valsche, Pinkerton. Cap Valsch, M. B. Kaap Valsche (False Cape) Dutch.—P.
[b] "70 Fr. leagues."
[c] See the Comparative Chart of the Spanish and other discoveries in Dalrymple.
[d] *Keerweer*, (Dutch,) Turnagain.—P.
[e] "Le cap Blanc" White Point. Pinkerton.—P.
[f] "Between 400 and 500 Fr. leagues."
[g] "5 to 130 Fr. leagues."
[h] "Arfuk," Arfak, Pinkerton.
[i] Valentyn, Amboyna, p. 208—289.
[k] Ibid. Description of Banda, 64 and 67 (Account of the Expedition of Keyts.)

black, and rough to the touch, the eyes large, the mouth extremely wide, the nose flattened, the hair curled, but hard, and of a shining black.[a] The women have enormously large hanging breasts. Their dwellings are built in the water, on a scaffolding. In this particular they resemble the Borneans, and some other Asiatic islanders. The women appear to be industrious. They make mats and earthen pots, which they bake with dried grass, or brushwood. They even handle the axe, while their indolent husbands look on, or occupy themselves with preparations for hunting the wild boar.[b]

The aspect of these people is frightful and hideous. Their skin is often disfigured with marks of a leprous appearance. They form the hair of the head into enormous bunches, sometimes three feet in circumference. Sometimes they adorn it with the feathers of the bird of paradise, while a number of boar's tusks are hung from the neck as objects of luxury. The religious creed of the Papuas is little known. They build tombs of hard coral rock, which they sometimes adorn with sculpture. Their principal trade is with the Chinese, from whom they purchase their tools and utensils, and the coarse Indian stuffs which are used as clothing for the women. They give in exchange, massoy, ambergris, sea snails, tortoise shell, small pearls, birds of paradise, loris, and other birds, which they dry with great skill. Some slaves are also exported, who are no doubt prisoners of war. Armed with javelins, bows and arrows, and even with copper swords, the inhabitants of the west coast have repelled detachments of Dutch soldiers who were sent into their country. Captain Cook saw, near Cape Valsch, savages armed with a tube from which smoke and flame issued, but accompanied with no report.[c] The precise nature of this weapon is not known. The learned navigator, Dampier, admires the lightness of the boats, or *proas*, which these people manage with much dexterity, and adorn with elegant carvings.[d]

Some of the small adjoining islands are better known. Among the Schouten Islands, four had flaming volcanoes when the Dutch passed them ; their soil was very fertile. The islands of Moa, Arimoa, and others, have the appearance of gardens of cocoa trees and other palms. All the islands on the northern coast appear to be very populous.

To the north-west is seen Waijoo,[e] an island of considerable size, which is said to contain 100,000 inhabitants. The land is elevated, and contains some very high mountains. In the north part of it are the two excellent harbours of Piapis, and Offak.[f] This island, called Ooarido by the natives, is covered with trees of great size. The inhabitants go entirely naked, with the exception of a piece of coarse cloth, which they wear about the middle. Their chiefs are dressed in stuffs, which they purchase from the Chinese. They also like the latter, wear a conical hat of palm leaves, and the greater part of them speak Chinese. Their hair is curled, very thick, and pretty long. Their skin is not very black. Some of them allow their mustaches to grow. They are skilful in the use of the bow. They live on pigs, turtles, poultry, shaddocks, cocoa nuts, papaws, gourds, purslain, sugar cane, yams, sweet potatoes, citrons, pimento, and green ears of maize roasted. Labillardière found here the beautiful promerops of New Guinea, the large black cockatoo, and a new species of cacao, which he designates the cacao of Waijoo.[g] Wild cocks and the tufted pheasants of India, are very common in the woods surrounding the excellent roadstead of Boni-Saini.

Salwatty[h] is also a populous island, governed by a rajah. Its inhabitants resemble those of New Guinea ; their appearance is frightful, and their character very ferocious. They live on fish, turtles, and sago.

The most suitable point of transition from New Guinea to Polynesia, or Eastern Oceanica, will be found in the islands of St. David and the Freewill islands. These are situated to the north of Schouten Island, and peopled with a race exactly similar to the inhabitants of the Marian and Sandwich Islands, Otaheite, and New Zealand. " Here," says Carteret, " we met, for the first time, with copper-coloured, long-haired Indians."[i] They build their villages in groves of cocoa-trees, bananas, and bread fruit. Their armour, made of matting, resists a pistol bullet. Their language resembles that of the Sandwich Islanders,[k] a remarkable circumstance in the history of the Oceanian nations.

To M. D'Entrecasteaux, the group of St. David, discovered in 1761, and that of Freewill, discovered in 1768, appeared to be the same archipelago. It is certain that the islands visited by Meares are the same with those the position of which was fixed by the French navigator. But as Meares and Carteret do not agree about the number of the islands, nor their latitude, and since low lands easily escape the view of navigators, it is possible that a chain of islets, of little elevation, may extend in the direction pointed out by "the low islands" of Bougainville, and the island of Aiow.[l] An English navigator has just published a note, in which he gives the name of St. David's Islands to a group situated in 55 minutes of south latitude, and 134° 20′ of east longitude. The particulars which he gives respecting the inhabitants, coincide with the preceding accounts.[m] If this opinion is admitted, the islands of St. David will only be the western portion of the archipelago of the Schouten Islands.

[a] Sonnerat, Voyage, III. p. 399.
[b] Forrest, Voyage à la Nouvelle Guinée, tom. I. p. 110—112.
[c] Hawkesworth, III. p. 658.
[d] Figured by Abel Tasman, (Valentyn, IV.)
[e] " Waigiou, Wadjou," Waygoo.
[f] Forrest's Voyage, I. p. 90.
[g] Labillardière, tom. II. p. 291.
[h] " Salawatti."
[i] Carteret, in Hawkesbury's Account, I. p. 608.
[k] Meares' Voyage, p. 84. (Forster's translation.)
[l] " Aiou."
[m] Bradley, in the Annual Register, 1817. Miscellan. Tracts, p. 916.

Table of the Geographical Positions of the Great Compound Chain extending from New Zealand to New Guinea.[a]

Places.	South Latitude.	Longitude East from Greenwich.	Authorities.
New Zealand.	deg. min. sec.	deg. min. sec.	
North Cape	34 22 0	173 20 15	Cook.
Cape Maria Van Diemen	34 30 0	173 1 30	D'Entrecasteaux.
Idem	- - -	172 42 15	Cook.
East Cape	37 42 30	181 0 15	Idem.
Dusky Bay	45 47 25	169 18 25	Cook and Wales.
West Cape	45 54 0	166 41 15	Idem.
Chatham Island	45 53 0	183 5 15	Broughton, corrected by Beaupré.
New Caledonia.			
Queen Charlotte's Cape	22 15 0	167 13 0	Wales.
Prince of Wales' Cape	22 26 30	- - -	Cook.
Balade Haven	20 17 11	164 24 46	D'Entrecasteaux.
Northern Point of the Reef	18 3 0	162 42 15	Idem.
Archipelago del Espiritu Santo.			
St. James' Bay (in Terra del Espiritu Santo)	15 20 0	- - -	Quiros.
Cape Quiros (Idem)	14 44 0	149 15 15	Cook.
Port Sandwich (Malicolo)	16 25 0	167 55 37	Idem.
Sandwich Island	17 45 0	128 30 15	Idem.
Port Resolution (Tanna)	19 32 0	169 45 0	Wales.
Solomon's Islands, &c.			
Cape Byron (Santa Cruz Island)	10 41 0	166 4 47	Rossel, Beaupré.
Cape Boscawen (Idem)	10 51 5	165 43 30	Idem.
Swallow Island	10 26 0	166 20 15	Wilson's Chart.
Baxos de Candelaria	6 45 0	160 5 15	Mendana & Fleurieu.
Bradley's Shallows	6 52 0	161 6 15	Hunter.
North Point of Isabella Island	7 30 0	- - -	Mendana.
Port Praslin (Ibid)	7 25 0	157 52 15	Surville.
Idem	- - -	158 30 15	Rossel and Beaupré's Chart.
Eddystone Rock (Indian Bay)	8 12 0	159 28 15	Shortland.
North Cape (Booka Island)	5 0 30	154 35 15	Rossel and Beaupré.
Archipelago of New Britain, &c.			
Cape Gloucester (New Britain)	5 29 0	148 20 15	Dampier.
Cape Anne (Idem)	6 54 0	148 24 15	D'Entrecasteaux.
Port Montague (Idem)	6 10 0	150 40 15	Idem.
Cape St. George (New Ireland)	5 0 0	152 16 15	Dampier (Rossel.)
Carteret Harbour	4 29 0	152 40 45	Idem. Idem.
Cape Salomaswer (New Hanover[b])	2 10 0	150 18 15	Maurelle.
La Vendola (Admiralty Islands)	2 14 0	148 9 15	D'Entrecasteaux.
Admiralty Islands (north-west point)	1 57 0	146 35 15	Bougainville, Rossel.
Hermits' Islands (north point)	1 28 0	148 20 15	Dampier and Rossel.
New Guinea.			
Moa Island	2 7 0	138 47 15	D'Entrecasteaux.
Cape Dory	0 35 0	133 44 15	Idem.
Idem	0 21 0	131 0 15	Forrest, (incorrect.)
Cape of Good Hope	0 19 5	132 26 15	D'Entrecasteaux.
Mispalu (Western Island)	0 19 15	132 7 15	Idem.
Cape Rodney	10 3 22	147 46 0	Edwards.
Louisiade.			
Cape Deliverance, (in Rossel Island)	11 21 0	154 26 15	Rossel.

[a] "Geographical Positions of Central Oceanica, eastern part."—M. B.

[b] The true name is "Solomon Sweer's Point." See the Plates of Abel Tasman's Voyage, No. 22. sect. X. in Valentyn.

BOOK LVIII.

OCEANICA.

PART VI.

Eastern Oceanica, or Polynesia.

We have already made some general observations on the numerous groups of small islands scattered over the surface of the Great Ocean, which, under the name of Polynesia, constitute the most easterly portion of Oceanica. We have taken notice of the identity of origin of many among them, consisting of volcanic depositions or accumulations of sand on reefs of coral. We have also discussed the questions relating to the still more astonishing identity which appears in the physical character, languages, and manners of the tribes diffused over these countries. We shall now give a separate description of the principal islands. It would be a heavy undertaking to enumerate the whole, and superfluous to repeat under each these particulars which have necessarily a close resemblance to one another.

When we leave the Molucca sea, we come first to the Pelew Islands. These had been first visited by the Spaniards, who called them the Palaos; but were little known previously to the agreeable and interesting account composed by Mr. Keate, from the papers of Capt. Wilson, who was shipwrecked here in 1783. This ingenious writer has perhaps given some embellishment to the picture. The inhabitants of the Pelew Islands are always represented as an amiable, gay, and innocent people. They are handsome, and of middling stature. They are darker than the shade called copper-colour, but not black, and their hair is long and flowing. The men go naked; the women wear small aprons, or rather fringes, made of the fibrous covering of the cocoa nut. Both sexes are tattooed, and their teeth are blackened. They do not appear to have any idea of religion, though they conceive that the soul survives the body. Their language seems to be derived from the Malayan, so extensively diffused through the islands of these seas.

The government is vested in a king, under whom are *rupaks*, or chiefs, forming a sort of nobility. The whole land is the property of the sovereign. His subjects can only be proprietors of moveable articles, such as canoes, arms, and some rude pieces of furniture.

These islands are generally of middling elevation, and covered with close woods. To the west they are beset with a long coral reef, at the distance of five or six miles from the shore, and in some places at more than double that distance.[a] Ebony grows in the forests; bread-fruit and cocoa trees seem to be abundant.

Our poultry exists among this people in the woods, and in a wild state. The natives neglected them till they were instructed by the English in the use which might be made of them as articles of food. Fish form their chief subsistence. They make a sort of preserves of the sugar cane, which appears to be indigenous in these islands. They rise at day-break, and take a cold bath. Their houses are fixed on broad stones, raised about three feet from the ground, and are made of boards and bamboo. They have large halls for their public meetings. Their best knives are made of mother-of-pearl. They have also some made of muscle shells and split bamboo. They manufacture a coarse earthen ware. Their furniture and tools resemble those of the Otaheitans. Their arms are pikes, javelins, and slings. Their canoes are made of the trunks of trees, and ornamented with very handsome sculpture.

To the north of the Pelew Islands are those called the Matelotes, Martyrs' Island, Sagavedra, and some others. Some Spanish navigators have re-discovered these islands, which appeared doubtful.

The groups of St. Andrew, Pedro, Warwick, Evening, and some others to the south, are imperfectly known.

Turning to the north-east of the Pelew Islands, we find the Marian Islands, a chain of fifteen or sixteen, six only of which are of considerable size, viz. Guan, Zarpane, Tinian, Saipan, Anatajan, Pagoo, and Agrigam.

These islands were discovered in 1521, by the celebrated navigator Magellan, who called them the Ladrones, on account of the strong propensity of the inhabitants to thieving, and the skill with which they carried on their depredations. But under Philip IV. the name of the Marian Islands was given to them in honour of Mary-Ann of Austria.[b]

The natives have been almost exterminated by the Spaniards. In complexion, language, manners, and government, they seem to have borne much resemblance to the Tagals of the Philippine Islands. Though subject to a hereditary nobility, they lived in peace and happiness.[c] Their small vessels, called *proas*, have been considered as models of naval architecture. Pigafetta and Anson, at very distant periods, remarked their excellent construction. They are canoes which are convex on one side and strait on the other. These have an outrigger to keep them in equilibrium. They sail at

[a] "Two Fr. leagues, and in some places even six."
[b] Brating, Mem. on the Marian islands, translated into French, in "Annales des Voyages."
[c] Father Gobien, in Desbrosses, II. p. 495.

the rate of twenty miles in an hour with a side wind. By joining two such boats by a platform, several islanders of the Great Ocean have formed vessels which that masterly seaman, Sir Sidney Smith, thought worthy of being imitated, and introduced in the navies of Europe.[a] A missionary asserted, that before the arrival of the Spaniards, they were ignorant of the use of fire, and took it for an animated being. Their islands are filled with volcanoes, and if there is any foundation for his assertion, they must rather be considered as worshippers of fire. But their known industry, and the whole aspect of the facts, declare this story to be void of foundation. The natural geography of these islands is little known. La Peyrouse found some of them to be volcanic. Assumption Island contained formidable torrents of lava in all directions.[b]

The Spaniards found them without a single quadruped, and brought them horses, cattle, and hogs, and, according to some accounts, guanacos, or lamas.[c] The only vegetables known to them were the jack, or bread-fruit tree, the cocoa tree, the orange, and the water melon. Rice was planted here by the Spaniards.

The island of Guan, almost depopulated by the tyranny of successive governors, began to breathe a little in 1772, under the wise administration of Don Tobias. He accustomed the Indians to different sorts of culture. Since that period the island produces maize, cotton, indigo, cocoa, and sugar cane.[d] Agana is its capital, and has a roadstead protected by a battery of eight guns.

The island of Tinian has been rendered famous by the brilliant description given of it in the history of Lord Anson's voyage. Navigators who, for a long time, have wandered over seas, sometimes tossed by storms, and subjected to privations and diseases, are quite charmed when they meet with a country clothed with a little green sod. They enlarge on the superior beauties of places which are far from being extraordinary. Hence, all the navigators, who, on the faith of such accounts, have landed on the island of Tinian, have been disappointed in their expectations; and some, among whom was Byron, have laboured to depreciate the island of Tinian, as much as it had been formerly extolled. Anson found here a prodigious quantity of wild cattle, which were white-coloured, excepting the ears, which were generally brown or black. They had probably been carried there by the Spaniards, to supply the garrison of Guam. He found also orange, cocoa, and bread-fruit trees. It certainly appears to contain all these different sorts of provisions; to which modern travellers add the lemon, the mango, the pine-apple, and the guava.[e] But very simple causes, political or physical, would be sufficient suddenly to strip so small an island of these advantages. A hurricane, an earthquake, a disease among the cattle, a bad governor, the arrival of a certain number of ships, might transform Tinian from a paradise into a desert.

To the north of the Marian Islands, are different groups of small islands, almost all of them volcanic. Several of them have no other name than that of Volcano Island; and others have names of similar import, such as Sulphur Island. There are two collections of reefs surrounding two small islands, to which the imposing name of "The Gardens" has been given. The "Gold" and "Silver" islands, probably owe their names to Japanese fables.

In these seas is situated the famous pyramidal rock, called Lot's Wife. A sea neither broken nor interrupted for an immense space in all directions, here dashes with sublime violence on the solid mass which rises almost perpendicularly to a height of 350 feet. On the south-east side is a deep cavern where the waves resound with a prodigious noise.

No question in geography is more obscure than that of the position of the Caroline Islands. All that we know is, that this archipelago lies between the Pescadores on the east, the Marian Islands on the north, and the Pelew Islands on the west.

It is probable that the little chains composing the great chain of the Caroline Islands run nearly south and north, like most of those of the Great Ocean.

Waiting till some accurate navigator shall remove the veil by which this country is at present covered, we shall adhere to the interesting account of those generous missionaries, who at the peril of their lives have carried even into this corner, unknown to geography, the doctrines of virtue and of peace.[f]

The first idea of these islands appears to have been conveyed to the Philippines in 1686, by a family of savages, who, intending to sail from one island to another, had been carried off by the winds and the currents. The Spaniards first called them the New Philippines, and afterwards the Carolines, from the name of their king, Charles II. They are about eighty in number, and very fertile. They enjoy an agreeable climate, but are subject to dreadful hurricanes.

The inhabitants, who are very numerous, resemble those of the Philippine islands; their complexion is a deep copper colour. According to the letters of the Jesuits, each island had its own chief; but the whole acknowledged the authority of one king, whose residence was at Lamurca. The nobility are haughty, and the people enslaved. These islanders believe in celestial spirits, which come to bathe in a sacred lake in the island of Fallalo, but they have neither temples nor idols, nor the least appearance of religious worship. The inhabitants of Yap are said to worship a species of crocodile, and to have among them a set of magicians. Polygamy is allowed. Criminals are sentenced to banishment from one island to another. They are fond of dancing, which they accompany with singing, being unacquainted with musical instruments. Their only arms are a bow, and a lance pointed with bone. Their proas are similar to those of the Marian islands. According to the missionaries, they are acquainted with the magnetic needle, a circumstance which would lead us

[a] Boswell's Notice of the Experiments of Sir Sidney Smith, in the Annual Register, 1805, Miscellaneous Tracts, p. 855.
[b] La Peyrouse, Voyage, II. p. 346.
[c] Byron, Voyage, p. 121.
[d] La Peyrouse, t. II. p. 350.
[e] Shortland and Marshall, translated in Forster, Magasin des Voyages, I. 191—199.
[f] Father Cantova, in the "Lettres Edifiantes," II. p. 4; and Desbrosses, Histoire des Navigateurs, supplément, tom. II. p. 43.

to infer some ancient intercourse with the Chinese, or with the Arabians. The language probably varies from one group to another. The missionaries found in it a considerable resemblance to the Tagal, and consequently the Malay language, but they give some words in which we perceive an affinity to the Arabic, such as *eli* for spirit. Even in this remote corner of the world, the practice of negro slavery is known. It is said that twenty-five Spanish negroes left in one of the islands produced a mixed breed, which has subsequently spread to another. We are informed that the inhabitants of Ulea are the most civilized. Hogoleu, the largest of the Carolines, must be about eighty miles long, and forty broad.[a] Yap ranks next to it, occupying the western extremity of the chain.

Captain Wilson returning from the South Sea, after leaving the English missionaries, sailed by the south of the Caroline archipelago, in the 7th degree of north latitude. Here he visited some islands, and among others, a large group which he called "the Thirteen Islands;" the most southerly of which is in 7° 16′ of north latitude, and 144° 30′ of east longitude. The inhabitants are copper-coloured, the women of a pale olive; their lips rather large, their faces broad, and their hair black and long. Their idiom differs from that of the Pelew islands, which are near them.[b] They sell cords of great strength, made of a kind of rush; they wear a sort of girdle resembling a Spanish scarf, and conical hats like those of the Chinese, which are also known in the Philippine islands. A hundred and fifty canoes were seen, each, on an average, containing seven men.

From this we pass on to the long chain of the Mulgrave Islands, discovered by Marshall and Gilbert in 1788. We only know their positions, and their English names. They are mostly low, and produce cocoa trees, oranges, and cabbage palms. Their copper-coloured inhabitants seem to be of a hospitable character, and able seamen.[c] This chain is connected with the Carolines, by the Pescadores, or Fishers' Islands, and probably with the other archipelagos of Polynesia by chains still unknown, where we must search for the islands of Jesus, the Solitary, and some others seen by Quiros and Mendana. We know exactly the position of the two islands, St. Augustine, and Gran Cocal, which have been lately visited. They indicate a chain to the south. The island "de la Gente Hermosa," *i. e.* of the Fair Nation,[d] will be one day re-discovered. It was seen by Quiros, at a distance of 4432 miles[e] from Lima, and in 10°. 20′ of latitude. The inhabitants, remarkable for their whiteness, sailed in double canoes, and built elegant huts of the trunks of palm trees.[f]

All the seas west from the Navigators' Islands, to Solomon's group, seem to contain a number of detached islands. The most remarkable of them is that of Rotumahoo, the Taumaco of Quiros. Captain Wilson, returning from his missionary voyage, landed here, and tells us that the fertility and population of that detached island were amazing. In a space less than an English mile long, 200 houses were counted, besides others which must have been concealed by the trees. Pigs, poultry, and fruits, were in great abundance, and it formed an excellent place of refreshment. According to Quiros, it is 138 miles[g] from Terra del Espiritu Santo. The language of the New Hebrides, and that of the Friendly Islands, seem to be known here, for the chief took the name of Taurik, evidently the title Terik, given to the chiefs of the Friendly Islands, and likewise that of Toomai, which was probably the word Tomar, signifying "Friend" in the language of the isle of Tanna.[h] The adjoining islands to the west were called Temelfica, Indeni, and Manci; the last contained a volcano. Quiros saw several, but gave their position vaguely. The inhabitants of Taumaco were acquainted with Mallicolo, and drew, by means of pebbles, a chart of the neighbouring archipelagos.

More to the south is the large group called the Feyjees,[i] or Prince William's Islands. The Feyjeans have the reputation of being cannibals. They are more industrious than the people of Tongataboo, according to the acknowledgment of the latter, who, notwithstanding, have subjugated them. Such of these islands as Captain Wilson saw in 1796, were of ordinary elevation, covered with cocoa-trees to the summit, and surrounded by extensive and dangerous reefs. The missionary ship was nearly lost in broad day light and calm weather, by coming in contact with a reef of which no previous warning was presented.

Sailing eastward, we fall in with the hills and plains which compose the archipelago of the FRIENDLY ISLANDS. This division might be extended to the Feyjees in the west, to the Cocoa and Traitor's Islands in the north, to Savage Island in the east, and to Pylstaert in the south. Within these boundaries the Friendly Archipelago is very extensive, as it includes more than a hundred islands and islets. It ranks nearly the first archipelago in Polynesia, for the industry of its inhabitants, and the degree of political order which prevails in it.

The leading island is that which is called Tongataboo, or "The Consecrated Island." It is one of the most southerly. Navigators have described it in the minutest manner. Yet were it not for the account of Labillardière and the English missionaries, we should know very little about it. The country does not in general afford that magnificent sort of landscape which arises from a multitude of mountains, valleys, plains, rivulets, and cascades; but it displays a spectacle of the most abundant fertility.

The most frequent winds are those between the south and the east; and, when they are moderate, the sky is generally clear. When they become stronger, the atmosphere is loaded with clouds, but it is not foggy, and it frequently rains. According to the account of the missionaries, earthquakes are very frequent. The foli-

[a] "30 by 15 Fr. leagues."
[b] Missionary Voyage in the Duff, p. 304.
[c] Gilbert, in Forster's Magazine, I. 200—206.
[d] "De la belle nation."
[e] "1600 Span. leagues."
[f] Quiros, Viajero Universal, XVII. p. 170.
[g] "50 leagues."
[h] Forster, Voyage, II. 231. Quiros, l. c. 174.
[i] "Fidgi," Feejees.

age is subject to little or no sensible change in the course of the seasons, each falling leaf being replaced by another, so that there is a universal and continual spring. The missionaries found the air very healthy, but colder than they had been led to expect.

A coral rock, the only kind which is seen on the coast, is the basis of the island. There is scarcely any other stone to be found, except a species of *lapis Lydius*,[a] of which the natives make their hatchets. Though in several places the coral shoots above the surface of the country, the soil is generally thick. Under the vegetable mould lies a stratum of clay. M. Labillardière has given a view of the botany of this island. Under the shade of the forest grow the *Tacca pinnatifida*, the *Mussænda frondosa*, the *Abrus precatorius*, and the pepper plant, which the inhabitants use for making the pungent beverage called *Kava*.[b] They make mats of the *Pandanus ordoratissimus*. The *Hibiscus tiliaceus* springs spontaneously on the borders of the cultivated grounds, and close by the sea-side. Of its bark stuffs are made, which are much inferior in beauty to those of the paper mulberry. The species of cotton called *Gossypium religiosum* grows in the marshy grounds, but is not applied to any use by the inhabitants. Sandal-wood is also found here, and a large kind of nutmeg destitute of any aromatic quality.[c] The birds and insects are in great number. Multitudes of the rarest shells are found among the reefs.

The island of Tongataboo is divided into three sovereignties; Ahifo in the north, Mooa in the centre, and Ahodshi in the south-east.[d] Each of these districts has its sovereign. The reigning family of Mooa has the name of Footta-faihi, the name also of one of the national gods; the Footta-faihis seem to have been once absolute sovereigns of the island, and still preside in the sacrifices. But the Deugona-gabula, or prince of the northern canton, has latterly assumed the political ascendency. All the chiefs of the adjoining islands enjoy a despotic authority, but they do homage, and pay tribute to the state of Tongataboo. Even the islanders of Feyjee, so formidable in Captain Cook's time, have submitted to the yoke of Tongataboo. The power of this state extends in the opposite direction to the confines of the Navigator's Archipelago. Their fleet of war-boats is more respectable than that of the Otaheitans, and probably their navigation extends as far as Terra del Espiritu Santo. They gave Captain Cook a long list of the islands which they knew.

The people of Tongataboo sacrifice many human victims; and, notwithstanding their ideas of property, they make no scruple in stealing from strangers. M. Labillardière gives these islanders in general a much more depraved and barbarous character than would have been supposed due, from the accounts of Cook and Forster. He saw assassinations committed among them, accompanied by circumstances of the grossest perfidy.[e] Yet the more modern picture given by the missionaries does not altogether correspond with that of Labillardière. "The inhabitants of the Friendly Islands," according to them, "are deserving of the name which Cook has given them. Since the meaning of it has been explained to them, they seem to be greatly pleased with it. They exercise among themselves an astonishing degree of liberality. For a space of four months we neither saw nor heard of the slightest quarrel occurring among them. Infanticide and several other Otaheitan institutions are unknown among them; conjugal infidelity among the upper classes is severely punished, at least in the person of the seducer. The women are almost in a state of slavery. Polygamy is a prerogative of the chiefs." One of the missionaries here was lately converted into a pagan and a savage; but four years were sufficient to deprive him of all relish for the happiness which charmed him so much when contemplated in perspective.[f]

The missionaries believe that these islanders have no separate order of priests, though they have a multitude of deities, and a public form of worship. They have two great *natchés*, or religious festivals; one to implore the protection of Footta-faihi, for the newly planted fruits; the other at the end of harvest, to testify their gratitude to the same deity. Each person kills and brings the animal which he offers in sacrifice. Calla-Feilatonga is sovereign of the waves and the winds. The god Mauwi bears the island on his back; and the earthquakes take place when he tires of his load, and makes attempts to throw it off. The god of pleasure, Higgolayo, collects round him the souls of his worshippers in a paradise much resembling that of Mahomet.

The private and public buildings are much inferior to those of Otaheite, both for convenience and elegance. But they make up for this by the superior construction of their canoes. Their mats are so much better than those of Otaheite, that the sailors export them to the latter island, as an article of commerce. They also manufacture glossy stuffs, some of which are striped, some in squares, and various other figures. Baskets, combs, and other little productions of female industry, are made with taste and elegance. The fishing lines and hooks of these islanders are as good as those of Europe. Tongataboo has a large and excellent harbour, which admits of being well fortified.

The island of Eooa is called Middleburg by Tasman. It is a high land of a delightful appearance, well wooded, fertile, and well provided with fresh water. Though the soil is generally clayey, the coral rock is seen shooting up to a height of 300 feet above the level of the sea.

Anamooka, or Rotterdam, is the largest island of a group situated to the north of Tongataboo. Anamooka is, like Tongataboo, composed of a coral rock, covered with a good soil. It contains a greater quantity of bread-fruit and shaddocks than Tongataboo, and vegetables of all kinds grow here with greater vigour. The fields are not inclosed by so many hedges, nor so regular and well made; but the roads are covered with tufted bowers, which display beautiful flowers, and give out delicious perfumes. The numerous points of view afforded by the little elevations, and different groups of

[a] Lydian stone, or siliceous slate.
[b] Piper methysticum.
[c] Labillardière, Voyage, t. II. p. 101, 105, &c.
[d] Missionary Voyage, chap. XVI.
[e] Labillardière, tom. II. p. 109.
[f] Narrative of a Four Year's residence at Tongataboo, London, 1811.

trees, contribute also to adorn and diversify the appearance of this country.

Tafooa contains a volcano which the natives consider as the abode of a divinity.

Vavao is the Mayorga of Maurelle, a Spanish navigator. Latté is another island to which he has given its native name. That which he calls Amargura, is most probably Hamoa. These islands are very fertile, populous, and at least as far advanced in civilization as Tongataboo.

To the south of the Friendly Islands, Vasquez Island, and Kermadec Islands, mark the continuation of the submarine chain to the east side of New Zealand.

To the north of the Friendly Islands we distinguish among some small detached islands the picturesque island of Horn, the fertility of which is extolled by Lemaire and Schouten. Its chief wore a crown of feathers. It is probably the *Enfant perdu* of Bougainville.[a]

As we continue our voyage to the east, the first large archipelago that claims our attention is that of the NAVIGATORS, discovered by Bougainville, and examined by La Peyrouse. Those which have been visited are seven in number, viz. Pola, at the west end, then Galinassa, Oyolava, Maoona, Fanfooe, Leone, and Opoon. The inhabitants are acquainted with three others, situated to the south-west. In Arrowsmith's learned chart of the Great Ocean, Pola is called *Otawhee;* Oyolava, *Oatooah;* Maoona, *Tootooillah;* and Opoon, *Toomalooah.* Tootooilla is found in the list of islands given to Captain Cook by the inhabitants of Tongataboo,[b] a circumstance which adds some weight to the English nomenclature. But the islands have probably different names in different native dialects. This archipelago received the name of the Navigators' Islands, because the inhabitants had a great many boats, and displayed an admirable degree of skill in the management of them, a circumstance common to the whole of Polynesia, and only applied particularly to this archipelago, because the inhabitants seemed to spend a greater part of their time in their canoes than others, and to have a greater number.[c]

The Navigators' Islands consist of high land. Their central mountains, the beautiful plains on the sea side, and the encircling coral reefs, give these islands a character of resemblance to the Society Islands. Maoona is a very fertile island.[d] The French frigates which visited it were surrounded by 200 boats, filled with a variety of provisions, consisting of birds, pigs, pigeons, and fruit. In twenty hours Maoona furnished 500 pigs, and an immense quantity of fruit. The island is covered with cocoa, bread-fruit, and orange trees. The groves are enlivened by the murmurs of numerous cascades, and peopled with wood-pigeons and turtle doves. Pebbles of basalt are found among the coral rocks along the shore.

The women were very handsome, their forms were regular and highly pleasing, and their manners were free. A scarf, made of leaves, serves them for a girdle. Their hair is adorned with flowers, and entwined with green ribbon. Were it not for their dark complexion, they might pass for nymphs or dryads. The men are above the ordinary stature, uncommonly strong, and very fierce. They despised the diminutive size of the French. They treat their women like slaves. La Peyrouse describes them as exceedingly dissolute in the intercourse of the sexes.[e] The situation of their villages is as delightful as fancy can picture. They are partially seen half buried in the bosom of rich natural orchards. The huts, supported on rows of strong pillars, are covered with cocoa leaves. The inhabitants live on pork, dog's flesh, birds, bread-fruit, cocoa nuts, bananas, guavas, and oranges. They set little value on iron and clothes, being fonder of glass beads than any thing else that the Europeans can offer them.[f]

It was at Maoona that Captain De Langle, Lamanon the naturalist, and nine sailors, were massacred by the inhabitants, probably because the Captain gave glass ornaments to some chiefs, and neglected others. La Peyrouse, cruelly undeceived in the favourable ideas which had been given him of the character of the savages, says on this occasion, "I am a thousand times more angry with the philosophers who praise the savages, than with the savages themselves. The unfortunate Lamanon, whom they massacred, told me the day before his death, that the Indians were better people than ourselves."[g] Both views are equally superficial. Savage and civilized people differ little in their conduct when placed in similar circumstances.

At Oyolava M. de La Peyrouse saw the largest village in all Polynesia. From the appearance of its smoke, it might have been taken for a city. The sea was covered with boats, manned with people as tall as those of Maoona.

Though the islanders of this group are distinguished by a ferocity hardly observed in any other part of Polynesia, they are very industrious, and display much skill and ingenuity. With simple tools of basalt, they succeed in giving an exquisite polish to their works in wood. They not only make cloth of bark, but manufacture some from a kind of thread which they undoubtedly procure from a flax resembling that of New Zealand. A native of the Philippines, on board the French vessel, understood their dialect, which must therefore be of Malayan derivation.

According to the same navigator, Oyolava is at least equal to Otaheite in beauty, extent, fertility, and population. He supposes that the whole archipelago contains 400,000 inhabitants, which we may reduce to one tenth, and probably come nearer the truth.

If it should some time hence be thought eligible to divide Polynesia into natural regions, the Pelew, Marian, Caroline, and Mulgrave Islands, would be included in

[a] Voyage Autour du Monde, p. 24.
[b] Cook's Third Voyage.
[c] The author simply says, "a circumstance common to the whole of Polynesia, and therefore not a distinctive appellation of any one groupe of islands."
[d] Voyage de La Peyrouse, t. III. p. 264.
[e] Les vieillards, retenant par force les jeunes filles, servaint de prêtres et d'autel au culte de Vénus, pendant que des matrones célébraient par des chants ces noces brutales. Voyage de M. de La Peyrouse, t. III p. 275.
[f] Idem. Ibid. p. 282.
[g] Idem, t. IV. p. 439

Western Polynesia, the centre of which would be Hogoleu. The Navigators', the Friendly, and the Feyjee Islands, with all those lying between St. Augustine and the Kermadecs, might be called Central Polynesia. This region is separated by an open sea from Eastern Polynesia, of which Otaheite is the centre. We proceed to make this celebrated island a station from which we shall obtain a view of Eastern Polynesia, of which it also furnishes a specimen of extensive application.

The Society Islands have formed the subject of more writings than many a kingdom of Europe. Every reader has admired the charms of Queen Oberea, and viewed in imagination the festivals of Pomarre. The Otaheitans are better known to us than the inhabitants of Sardinia or of Corsica.

Though the name of the Society Islands was originally given by Captain Cook only to the group of Uliétea and Huaheiné, it has since received a more extensive application on Cook's own authority. It comprehends Otaheite with its dependencies, and, with some, though improperly, several remote and detached islands, as far as Toobooai in the south, and Palmerston Island in the west.

Otaheite[a] has merited the title of Queen of the Pacific Ocean. It is composed of two conical mountains united by a marshy isthmus. The larger peninsula is of a circular form; its diameter is twenty-four miles.[b] The smaller peninsula, in the south-west, is an oval, sixteen miles long, and eight or ten broad.[c] The whole circumference of the island is 108 miles,[d] according to the chart given by the English missionaries.

Between the mountains and the sea, a low stripe intervenes, varying in breadth. In some places, especially in the north-east, the rocks project over the sea. In the plain and in the valleys by which the mountain is intersected, the ground is covered with a thick blackish slime, and extremely fertile. As we ascend the hills, the rich earth of the valleys is exchanged for veins of clay and marl of different colours, lying over strata of a soft brownish sandstone. Basalt seems to predominate in the higher mountains. On the side of the great mountain is a very deep fresh water lake. Matavai, on the north side of the island, is considered as the principal harbour. On the south-east side is another, called Langola,[e] which is equally good and safe. On all sides of the island rivers are seen descending in beautiful cascades.

The situation of this island, in the midst of an immense ocean, far from all extended lands, renders its heat far from insupportable. The missionaries say that the dry and rainy seasons vary even in the different districts of this small country. In the north, the bread-fruit harvest begins in November and ends in January; but, on the south side, it begins in January and continues till November.

All the vegetable species peculiar to Oceanica grow in Otaheite in abundance, and of the best quality. There are reckoned eight varieties of the bread-fruit,[f] and fifteen of the banana.[g] The very great perfection of the fruit shows that the trees have been cultivated here for several ages. The *Spondias dulcis*, called *Evi* in Otaheitan, nowhere produces apples of a richer yellow, or more delicious taste. The sugar cane, which is called *To*, is of a superior sort to that of the East Indies, and now receives the preference in all the colonies. The bark of the *Morus papyrifera* furnishes the material of a fine and soft cloth. The inhabitants have treated lightly all European plants offered to them, with the exception of the tobacco plant, which is valued for its flowers.[h] There are several kinds of wood fit for carpentry and cabinet work. The missionaries give the native names of some species, which equal mahogany in beauty and ebony in hardness. There is some sandal-wood, both white and black. It grows only on the mountains, and is in no great quantity. The air is animated with birds, and the sea with fish, without number. The hog, of the same variety which is known in Siam;[i] and the dog, which is delicately fed, furnish good animal food.

The complexion of the Otaheitans is olive, inclining to a copper-colour. The men, constantly exposed to the sun, are very dark; but the women are only a shade darker than the brunettes of Andalusia and Sicily. They have fine black eyes, regular and white teeth, a soft skin, and limbs of graceful proportions. Their jet black hair is perfumed and ornamented with flowers. But the habit which they contract from their infancy of widening the face, expanding the mouth, and flattening the nose, gives them a masculine air which mars their natural charms. The chiefs are taller than the common people, few of them under six feet. The dress of the two sexes is nearly the same, except that the men wear the *maro*, a piece of cloth which covers the waist, and passes between the limbs. Another oblong piece, with a hole to let through the head, hangs before and behind; a third is wrapped about the middle, and a sort of square mantle covers the whole.

The Otaheitans practise circumcision. They tattoo their bodies not merely for the sake of ornament, and to please their vanity, but as connected with the political and religious institutions of the nation. Individuals of both sexes are not considered as independent of parental authority, or capable of forming civil connections, till they have received the last of a series of tattooings. The different acts of this operation are regarded as sacrifices agreeable to the gods; and the instrument with which a prince has been tattooed, is deposited in the *morai* of his ancestors. The society of the *arreoy* has, like that of free masons, several degrees, which are distinguished by different forms of tattooing.[k]

Their houses are only used as places of rest during the night, and of retreat during extreme solar heat. They are very elegantly-shaped huts, consisting of small wooden pillars, arranged in an oval form, and supporting a roof of palm leaves. The sides are sometimes closed

[a] "Taiti."
[b] "8¾ Fr. leagues."
[c] "6 by 3 to 4 Fr. leagues."
[d] "39 Fr. leagues."
[e] "Langara" Langaras, Pinkerton.
[f] Bligh's Voyage to the South Sea, p. 109.
[g] Wilson, Missionary Voyage, p. 378.
[h] Voyage des Missioniares Anglaise, p. 502, trad. allem.
[i] Forster, Observations, &c. p. 167, (in German.)
[k] Missionary Voyage.

with mats, sometimes open. The floor is strewed with hay, over which are laid mats, often very beautiful. These rustic mansions are scattered over all the plain, and in the valleys, in a manner the most agreeable and picturesque, in the midst of smiling plantations. The large palms tower above the rest of the trees. The banana displays its broad leaves, and here and there are seen specimens of its fruit ready for eating. Other trees, surmounted by dark green boughs, bear golden apples, which, in flavour and juiciness, resemble pine-apples. The intermediate spaces are filled with mulberry trees, yams, and sugar-canes. The huts are also surrounded with odoriferous shrubs, such as the *gardenia*, the *guettarda*, and the *calophyllum*.

In Otaheite the nobility who possess hereditary rights are distinguished from the people who are their dependents, without being in any degree their slaves.

The *Eri Rahei*, or sacred chief, is the hereditary monarch of the state, which in 1797 comprehended the island of Otaheite, and those of Eimeo, Tethuroa, and Maitéa, with claims on Ulietéa and Otaha. As soon as the *eri rahei* becomes the father of a male child, the child succeeds to the crown, and the father is then only regent.

An apron or *maro* of red feathers is the badge of the royal dignity. With this the young sovereign is invested in the midst of a solemn ceremony, in which the most remarkable thing is a formal harangue delivered to the people by the state orator, an office generally filled by one of the chief priests. Unhappily, human sacrifices make an essential part of this ceremony. One of the eyes of the victim is offered to the king, by a priest, who addresses him in a long discourse, probably on a religious subject.

The *eris* are the hereditary proprietors of large estates. They govern the districts; and they seem to be a sort of sovereigns in their own territory, though dependent on the *eri rahei*. The *towhas* are generally kinsmen of the *eris*. They govern some subdivisions of the great districts, or live at the courts of the *eris*. The *rattiras* are the possessors of estates. Their authority seems confined to the rights conferred by simple free property. The *manahoonis* are farmers without property in the soil, but enjoying personal freedom and complete power over the property which they acquire. They have it in their power to move from one landlord to another. The domestics are called *towtows*, and those who are in the service of females are called *toutis*. These last, like their mistresses, are excluded from all religious ceremonies. None of the commoners can rise to a higher rank than that of *towha* at most. The nobles, or eris, preserve all the dignity of their hereditary rank, though the monarch should see proper to deprive them of the management of their districts.

The missionaries say that property is held sacred; that the last will of the possessor is scrupulously executed, and that his goods are given up, either to his children, or to his *tayo*, (an adopted kinsman;) that estates are bounded by land-marks of stones, and that theft, violence, and even verbal injuries, are severely punished.[a]

The Otaheitans believe in a sort of trinity, called *Tani, te médooa*, the Father; *Oromattow, tooa ti te meidi*, God in the Son; and *Taroa-mannau, te hooa*, the Bird, or Spirit.

This great divinity resides in the palace of heaven, or the *Torova*, with a number of other divinities or Etooas,[b] who are all designated under the name of *Fhanaw po*, or the children of night. Their genealogy, like all the theogonies in the world, is a system of cosmography in an allegorical dress. The islands of the ocean are the remains of one great continent or island,[c] which the gods in their anger broke in pieces. These great divinities have one common temple in the district of Oparre, but they are only to be invoked in times of public calamity. The daily prayers are addressed to the inferior *etooas*. Every family has its *thi*,[d] or protecting genius, from whom it expects all the blessings and all the evils of this life. The souls of the dead, devoured by sacred birds, undergo a purification, and become divinities which exert a powerful influence on the lot of the living. The Otaheitans firmly believe that the soul is immortal, and that according to its degree of virtue and of piety, it will enjoy different degrees of honour and happiness. So very religious are they, that they never approach the sacred places but with profound respect. In the eyes of this susceptible people all nature is animated; the air, the mountains, the rivers, the sea, are peopled with spirits. The *tahooras*, or priests, are numerous and powerful. There are certain occasions on which all the chiefs officiate. The selection of human victims to be offered to the gods always falls on criminals, who are only put to death while asleep; a refined specimen of considerate humanity, modifying the dictates of a barbarous superstition.

The highest ambition of an Otaheitan is, to have a splendid *moraï*, or family tomb. The funerals, especially those of the chiefs, have a solemn and affecting character. Songs are sung. The mourners, with shark's teeth, draw blood from their bodies, which, as it flows, mingles with their tears; offerings placed on the bier, mock fights, religious abstinences, or days of fasting and of rest, are all employed to give a sensible expression of the public grief. The *tapapow*, or sheds, under which the dead bodies remain exposed till they dry, and the walled and paved *moraïs*,[e] or cemeteries, in which the bones are deposited, are placed in romantic situations, where the shadows of funereal trees, the frowning faces of the rocks, and the murmurs of rivulets, invite to retirement and melancholy.

Those who have represented the women of Otaheite as venal wantons, have done them injustice. We are now informed, that "it is difficult in this country to have private meetings, either with the married or unmarried women, excepting the girls among the lowest orders, and that many among these also are chaste and modest. There is indeed a class of prostitutes, as in all other countries: perhaps the proportion of them here

[a] Missionary Voyage, Appendix, chap. II.
[b] "Eitouas," Eatuas (Eng. orthography.)
[c] "Vénoua noï."
[d] *Thi* resembles the *div* of the Persians, and the *theas* of the Greeks.—M. B.
[e] *Tapapow* resembles the Greek *taphos*, a sepulchre, and *moraï*, which is rather pronounced mahraï, the Greek *marainein*, to consume.—M. B.

is larger than ordinary. Of this class were the women who went on board the European vessels, or frequented the camps which their crews pitched on shore."[a]

The English missionaries, who are members of the most austere sect of Methodists, say that they never witnessed any public indecency. They say that the lascivious dances are performed by none but giddy young persons, and that even these, beyond the circle of the theatre, do not indulge in any gestures in the least degree offensive.

The general conduct of the Otaheitan women, as mothers and wives, is sufficiently creditable to human nature. They bear their children with extreme ease, and make tender and assiduous nurses. The ornament which they esteem most valuable is a wig made of the hair of their deceased relations. Polygamy is not allowed among this people. But a detestable political institution formed, till very lately, a dark shade in the moral picture. Under the name of Arreoys, a great number of the Otaheitan nobles of both sexes had formed themselves into singular communities, in which all the women were common to all the men, and all the children born were destroyed.

From this it is not surprising to find, that, according to a calculation made by the missionaries, the population of the island had of late years decreased, and does not now exceed 16,000 souls, making an average of 250 to the square league, taking into account the whole extent of the island. But the only inhabited places are the plain and the low valleys.

The Otaheitans manufacture handsome cloths and mats. They seem to have once navigated a great part of the ocean; but their navigation has declined, and the island has been miserably reduced by the devastating effects of civil wars.

The moral character of this and the adjoining islands is now, however, undergoing a remarkable change. The steady exertions of the missionaries have been followed by decided impressions in favour of the Christian religion, and the manners, and even the dress, of civilized Europe. Pomarre, the late king, abandoned his idols, and shipped them off for London, where they now figure in the Missionary Museum. For the Missionaries they express a uniform and high respect. Those of them who have heard their doctrines have ranked themselves as converts; and those who know them only by report, express an eagerness to profit by their instructions. The latter have indeed suffered a serious loss in the death of Pomarre, their powerful protector; and some anxiety is felt for the peaceful continuation of their labours under the succeeding government, which is administered in the name of a minor. But they enjoy the advantage of a strong popular tide in their favour.

The other Society Islands greatly resemble Otaheite, though smaller. At Huaheine the fruits ripen some weeks sooner than at Otaheite. This island has two excellent harbours [b]—Ulietea[c] is larger; its inhabitants have darker complexions, and a ferocious character. This island, and that of Otaha, are surrounded by one common reef.—The inhabitants of Borabora, fifteen or twenty years ago,[d] were formidable to all the neighbouring islands. They had conquered Ulietea and Huaheine; but their power is now at an end.—Maitea, the most easterly, is the entrepôt for the tribute of pearls which the Otaheitans raise in the archipelago of low islands.[e]—Eimeo possesses two of the best harbours in the whole ocean.—The inaccessible Tethuroa serves as a citadel to the king of Otaheite, for the preservation of his treasure.—Mapija, or Lord Howe's Island, and Genuavra, or Scilly Island, are only inhabited by penguins, and other sea fowl.[f]

To the south-west and south-east of the Society Islands, a long chain of widely separated islands extends, beginning with Palmerston and ending with Easter Island. They might be called the "Austral Sporades."[g] The most westerly group comprehends Palmerston Island, Wateoo, Mangea, and some islets.[h] In the second group we find Toobooai, which contains robust and savage inhabitants; Ohiteroa, which is rich in casuarina trees, and a place which shows much human industry; and, lastly, the "*High* Island" of Captain Broughton. To the north-east and east are Gloucester Island, St. Paul's Conversion, Michael, and many others little known. In the south we distinguish Oparo, the inhabitants of which speak the Polynesian language, but do not tattoo their bodies.—Pitcairn Island is now peopled by the children of the mutinous sailors of Captain Bligh, whose fathers had escaped the search of the English. The fate of these sailors themselves was sufficiently dismal. They had married Otaheitan women, whose brothers in one night murdered them, only one escaping, whose name by his own account was Adams. On the following night, the Otaheitan widows of the English inflicted dreadful vengeance, by murdering all their brothers, who had committed the first bloody deed. Their children grew up under the fostering care of Adams, who, officiating as their patriarch, has made them an orderly and simple tribe, speaking the English language, and imbued with the sober principles of the more respectable portion of the lower orders of the English. Their number, when visited by the Briton, was forty-eight, all of mixed English and Otaheitan blood, except young Christian, the son of Captain Bligh's lieutenant, whose mother appears to have been English. They have a great antipathy to the natives of the other islands, whom they call "the Black Fellows," which has been generated by the accounts which they have received of the murder of their fathers.[i]

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[a] Wilson's Missionary Voyage.

[b] Spanish Voyages to Otaheite, in Viajero Universal, XVII. p. 324.

[c] Orayetea, (Forster.)

[d] Dating from 1813, when the original edition was published.—P.

[e] Spanish Voyages to Otaheite, in Viajero Universal, XVII. p. 323. See also Wilson's Missionary Voyage, Introduction, p. 27.

[f] Viajero Universal, p. 327. [g] So called by Malte-Brun.—P.

[h] The group, containing Mangea, is now called the Harvey Islands, and is situated between 500 and 600 miles S. W. by W. from Otaheite. Christianity has been recently introduced among them by native missionaries from the Society Islands. There are six principal islands, viz.: Mangea, population about 1200; 120 Christians; the king and most of the people idolaters. Rarotonga, population 6 or 7000; king and most of the people Christians; a great improvement in the arts and in morals. Aitutake, people mostly Christians, have a regular village, with plastered houses, and a pier. Maute and Mitiaro, small, people Christians. In Atui, the people were indifferent to instruction, although the chiefs were Christians. The Raivavai Islands, situated about 350 or 400 miles S. of Otaheite, have also been christianized by native teachers.—*Miss. Journal.*—P.

[i] See Shillibeer's Narrative of the Briton's Voyage to Pitcairn's Island, p. 77—97

The last of the Sporades are Ducie's Island, and the celebrated Easter Island,[a] the identity of which with Davis's land is not yet fully decided. In this arid volcanic isle, we find a sort of platforms on which shapeless columns are erected, sometimes fifteen feet high, with a rudely carved bust at top, the face of which is five feet long. It is made of a very light and porous red lava. These statutes seem to have a degree of resemblance with the sculptures of the island of Uliétéa. The heads have the character of the Polynesian race of men. The language, manners, and dress of the inhabitants of this island also resemble those of the other islands. There is nothing about them of Peruvian aspect. As the islands lying nearer to the American continent have been found altogether uninhabited, it is evident that the nations of America never contributed to the peopling of Polynesia.

In passing from Easter Island to the Marquesas, we must go through a singular region, sprinkled with small islands, which are low, sandy, and encircled with coral reefs. The islands composing this truly "Dangerous Archipelago," present strange forms; the names of the Harp, the Bow, and the Chain, express with precision the figure of those to which they are applied. Tiookéa is a large low island. All of them abound with cocoa trees. They produce scurvy-grass, purslain, and various other plants. Dogs which live on fish, and hogs, are found here as in the high islands. The race of men which they contain is the same, but darker in colour. Pearl Island is somewhat remarkable in its physical structure. There are several banks of coral rock, placed one behind another, between the lagoon and the sea. These banks run regularly from south to north. They sometimes rise fifty or sixty feet[b] above the level of the sea. Yet it appears as if violent storms had driven blocks of coral over the outermost banks, and piled them upon the innermost. The furrowed cavities which separate these successive banks, are generally sixty feet[c] in breadth, and ten or twelve feet deep.[d]

To the north of the low islands we find the lofty chain of the MARQUESAS ISLANDS, the chief of which are Ohitoa, or Sta. Magdalena; Onateyo, or San Pedro; Ohitahoo, or Santa Christina, and the island of Baux, or Nooaheeva.

The leading islands in this archipelago were discovered by Mendana, who gave them the name of Garcias de Mendoza, Marquis of Canete, viceroy of Peru. Hence they are sometimes called Mendoza's Islands. If we believe the account of Mendana's discovery, this small archipelago was inhabited by a very fine race of men. The women were remarkable for the beauty of their features; and their colour, though brown, was very agreeable; so that in personal appearance they rivalled the finest women of Lima.[e] These islanders were clothed in elegant stuffs, made of bark, which reached from the breast to the calf of the leg. They had wooden idols, and boats which held forty people. The air was so dry that linen hung out during the night collected no humidity. The "white fruit"[f] of Mendana seems to have been the bread-fruit.

The Marquesas do not differ from the Society Islands, except that they have not the beautiful fertile plains which encircle the latter, the hills extending to the margin of the sea. The coral reefs are less extensive, and the harbours which they form are less safe. The soil about the bay of Madre de Dios, or Revolution Bay, consists of ochry clay, trass, and puzzolana. The centres of the islands are occupied by piles of rocks resembling ruinous towers. The climate is a little warmer than that of Otaheite. The plants and fruits are nearly the same. The younger Forster says, that he nowhere found the bread-fruit so large and so delicious; that it was tender as custard, but a little too sweet; that cocoa nuts, however, were rare.[g] The English missionaries, on the contrary, found nothing to eat but cocoa nuts; poultry and pigs were rare; the *mahei*, or prepared bread-fruit, was indifferent; but the scarcity seemed to them to be only temporary.[h] It is their opinion that, even in the most fertile islands, such scarcities are rendered frequent by the improvidence of the people. "When they have pork," says Mr. Crook, the missionary, "they eat five or six meals per day; and after it is finished, content themselves with vegetables and fish."

The forests are filled with birds of splendid plumage, resembling those of Otaheite.

The Marquesans excel all the other tribes in the fine proportions of their forms, and the regularity of their features; and, if they were free from the tattooing process, in which the skin is blackened by numerous black punctures, their complexion would be nothing more than tawny. The tattooing of the Marquesans, however, is remarkable for its regularity and comparative good taste.[i] Their hair is of various colours, but never red. Some of the women are almost as white and fair as our European brunettes, and they are less generally tattooed than the men.[k] Their waists are bound round with a long piece of narrow stuff, the ends of which passing between the thighs, fold back again, and hang to the middle of the leg. But as their stuffs do not bear moisture, they came on board the Missionary ship in a state which reminded the company of mother Eve. The appetite of the goats in the ship was excited at the sight of the green leaves which they wore, so that they were obliged to make an unsuccessful struggle to prevent their bodies from being completely stripped.[l]

The religious ceremonies are the same as those of Otaheite. Each district has its *Morai*, where the dead are buried under large stones. They have numerous divinities, some of whose names resemble those of the gods of Otaheite. The women are more subjected to

[a] Ile de Pâques.
[b] "8 or 10 toises."
[c] "10 toises."
[d] Missionary Voyage, p. 285.
[e] Desbrosses, Hist. de Navig. tom. I. p. 251. Mendana, in the Viajero Universal, XVII. p. 65.
[f] "Blanc manger."
[g] Cook's Second Voyage.
[h] Missionary Voyage, p. 244. p. 260.
[i] Langsdorf, Voyage Autour du Monde. See the "Annales des Voyages," XIV. 257.
[k] Missionary Voyage.
[l] Idem.

the men than among the Otaheitans. The chiefs indulge in polygamy; they have no great authority among the people. These islanders appear in fact to be without laws, and regulated solely by their customs. The English methodists have undertaken the task of converting these children of nature, by preaching protestantism to them in its austerest form. But they do not appear as yet to have succeeded to the same extent as at Otaheite.

By sailing due east from the Marquesas Islands, it is probable that some important discoveries might be made. Perhaps Roggewyn's Archipelago would be re-discovered, consisting of the Baumann Islanders, five or six in number; the Roggewyn Islands, which are small; and Tienhoven and Groningen, which are probably as large as Otaheite. These islands, seen in 1722 by Roggewyn, must lie between the 12th and the 9th parallel of south latitude; but their longitude was very vaguely given. No complete and authentic account of Roggewyn's voyage has been published. This navigator's journals are probably to be found in the archives of the Dutch East India Company. Tupia, the Otaheitan, said there were several large islands in that direction.

But the track of Captain Cook takes us off in a different direction. Turning northward, we follow this celebrated navigator to the SANDWICH ISLANDS. It is the most isolated group of all Polynesia, and the north-east extremity of this wide region. The island of Owaïhee,[a] is the largest, being 415 miles[b] in circumference. It obtained a fatal celebrity as the scene of Captain Cook's death, who was killed by the natives on the 14th of February, 1779. A celebrity of a different kind now awaits it as the focus of civilization in Polynesia. The inhabitants have, with the assistance of the English and Americans, built about twenty merchant vessels, with which they already perform voyages to the north-west coast of America, and even propose to visit Canton.[c]

These people sometimes wear their hair straight, sometimes curled as in Europe. They are darker in complexion than the Otaheitans. Captain King describes them as a gentle and benevolent race, less frivolous than the Otaheitans, and not so proud as the inhabitants of the Friendly Islands. They have made some progress in agriculture and manufactures. Yet they sacrifice human victims, though they are not known to be cannibals like the New Zealanders. They go unshaved. Both men and women have a fan made of cocoa fibres or long feathers to keep off the flies. They are tattooed like the other Polynesians. The women even tattoo the tip of the tongue. They use for clothing a piece of coarse stuff called a *Maro*, prepared in the same manner as at Otaheite, which passes between the legs and is fastened round the loins. In battle they wear for armour a closely woven mat thrown over the shoulders. On occasions of great ceremony, the chiefs wear a dress of brilliant feathers manufactured with great art. They live on fish, yams, bananas, and the sugar cane. The great make use of boar's and dog's flesh. The women wear nothing but a light scarf. Their hair is cut short behind, and put up in front.

The art of swimming is quite familiar to them. They glide through the water with uncommon vigour, nimbleness, and dexterity. On the slightest occasion they quit their boats, plunge under water, and emerge alongside of another boat at a distance. Women carrying children at the breast have been seen to commit themselves to the waves, when the strength of the surf would not suffer them to land in their boats. They will make a long stretch in swimming without hurting their tender charge.

Here, as at Otaheite, there is a supreme chief at the head of the government, called Eri-Taboo, whose funeral, when he dies, is honoured by the sacrifice of two of his subjects, and sometimes of a great number. The subjects are divided into three classes, the *Eris*, or district chiefs; the proprietors, who have no political power; and the *Tootoos*, who have neither rank nor property. These degrees of rank are hereditary. Captain Vancouver says, that the king of Owaïhee declared himself vassal to the king of Great Britain.

The climate of these islands seems to be more temperate than that of the American islands in the same latitude. The clouds are attracted by the mountains of Owaïhee, and the rain refreshes the interior, while the sun shines on the sea-shore. The wind generally blows from the east, and there are regular refreshing sea and land breezes.

Moonakoa mountain rises to a prodigious height. Anderson estimates it at 18,000 feet, but his calculation is vague and exaggerated.[d] [e] La Perouse found the soil of the island of Mowee composed of the powder of lava, and other volcanic substances.[f] Vancouver gives a representation of a pretended volcanic crater at Owaïhee.

Here, as in all similarly situated countries, the quadrupeds are very few in number, consisting only of hogs, dogs, and rats. The dogs are of the same species with those of Otaheite. They have short bent legs, long backs, and straight ears. The birds seem very numerous, but the species not greatly diversified. There are large white pigeons, owls, the common water hen, and a species of whistling plover. These islands produce sugar canes of extraordinary size, sweet potatoes, bread-fruit trees, bananas, cocoa-trees, and sandal-wood. All these productions, however, are less abundant than in the southern islands. The plantations are kept in admirable order. The water used for irrigating the fields is distributed by means of ditches and aqueducts.[g]

The first view of the island of Mowee[h] appeared quite enchanting to M. de La Perouse. The water fell in cascades from the sides of the mountains, and a thousand rivulets watered a coast which was so covered with

[a] Owhyhee, Owaïhi, Hawaii.

[b] "150 Fr. leagues."

[c] This improvement was brought about chiefly by the exertions of Tamaahama, who, after a series of destructive wars, had acquired the sovereignty of the islands. On his death, in 1819, idolatry was formally abolished by the government and people, and soon after, a family of missionaries from the United States commenced the work of christianizing them, which they have since continued with uninterrupted success. -P.

[d] Cook's Third Voyage.

[e] The highest mountains in Owaïhee are Moonakea and Moonaroa which are estimated by the missionaries at 15,000 or 16,000 feet high At the foot of the latter is the crater of Kirauea, about two miles long by one broad, and about 800 feet deep; the largest known.—P

[f] Voyage de La Perouse, t. II. p. 125.

[g] Vancouver. Manuel Quimper, in the Mercurio Peruano, VI. p. 2, &c.

[h] "Mowii."

houses, that a space of eight or ten miles[a] seemed to be one continued village. But the habitable part was only about three miles[b] broad, and the south and west presented nothing to the eye but steep and barren rocks.[c] Morotoi, to the west-north-west of Mowee, is destitute of wood, and its chief produce is yams. It has neither fresh water nor good anchorage.[d] Ranai contains some fertile districts. Woahoo[e] seems to be one of the most fertile and most beautiful islands of this archipelago. The inhabitants of the island of Atowi[f] excel their neighbours in the skill with which they manage their plantations. In the low districts, these plantations are intersected by deep and regular ditches. The hedges are exceedingly neat, and almost elegant. The roads across them, would, for completeness, do honour to European engineers.[g] But the fine plantations which Cook admired have been horribly devastated. Beautiful pines are carried hither by the Ocean, and formed into canoes by the inhabitants.[h]

[a] "3 or 4 Fr. leagues." [b] "¼ Fr. league."
[c] Cook's Third Voyage. La Perouse, t. II. p. 111. Vancouver.
[d] Vancouver.
[e] Oahoo. [f] Atooi.
[g] Cook. [h] Vancouver.

Table of the Geographical Positions of Eastern Oceanica, or Polynesia.

Places.	Latitude.			Longitude East or West from London.				Authorities.
	deg.	min.	sec.	deg.	min.	sec.		
MARIAN ISLANDS.								
Assumption Island	19	45	0 N.	145	35	30	E.	La Perouse.
Tinian (island)	14	55	0	146	0	0		Wallis.
Guam harbour	13	26	0	0	0	0		Crozet.
Sulphur Island	24	48	0	141	12	0		Gore and King.
CAROLINE ARCHIPELAGO.								
Palaos, or Pelew Islands	6 / 8	0 / 20	0	134 / 135	0 / 36	0 / 0		Wilson's Chart.
The Thirteen Islands, (the most southerly)	7	16	0	144	30	0		Wilson.
The Twenty-nine Islands discovered by the Pala frigate	3	30	0	156	20	0		Spanish Journals.
Yap	10	0	0	138	30	0		Arrowsmith's Map.
Lamurca	8	25	0	149	0	0		Idem.
Hogoleu	9	0	0	158	5	0		Idem.
THE MULGRAVES.								
Hooper's Island	0	3	0 S.	173	43	0		Gilbert and Marshall.
Maslar Islands	1	42	0 N.	175	1	0		Idem.
South Point of the Mulgraves	5	58	0	172	3	0		Idem.
Calvert Islands	5	58	0	171	41	0		Idem.
St. Augustine	5	30	0 S.	177	50	0		Maurelle, (doubtful.)
Rotumahoo or Taumaco	12	29	0	176	57	0		Edwards.
FEYJEE ARCHIPELAGO, &c.								
Duff's Reef	16	30	0	179	19	0	W.	Wilson.
Hemskerk Shallows	17	19	0	175	5	0		Tasman, (longitude too far east.)
Turtle Island	19	48	0					Cook.
ARCHIPELAGO OF THE FRIENDLY ISLANDS.								
Tongataboo, (French observatory)	21	7	35 S.	175	19	11		Rossel.
Eooa or Middleburg Island	21	16	30	174	50	0		Cook.
Pylstaert	22	26	0	175	58	45		Idem.
Anamooka or Rotterdam	20	15	0	174	47	47		Idem. Tasman.
Tofoa	19	45	0	175	5	45		La Perouse.
Latté	18	14	0	174	54	45		Idem.
Vavao or Mayorga	18	34	0	173	54	45		Idem. Maurelle.
Amargura	18	0	0 S.	175	9	45	W.	La Perouse, Maurelle.
Horn Island	14	18	0	178	18	45		Wilson and Burney.
Enfant Perdu, (the same?)[a]	14	22	0	176	42	45		Bougainville.
Wallis's Island	13	22	0	176	15	30		Edwards.
Isle of Cocoas	15	50	0	176	21	45		Burney and Schouten.
NAVIGATORS' ARCHIPELAGO.								
Opoon (east point)	14	9	10	169	1	35		La Perouse.
Leone (south point)	14	7	53	169	16	7		Idem.
Fanfooé (east point)	14	5	23	169	18	12		Idem.
Maoone (idem)	14	16	40	170	2	17		Idem.
Oyolava (NNE. point)	13	51	5	171	41	48		Idem.
Galinassa (N. point)	13	45	0	171	51	18		Idem.
Pola (west point)	13	32	0	172	34	15		Idem.
Palmerston Island	18	4	0	163	9	45		Cook.
Mangiea	21	57	0	158	16	45		Idem.
AUSTRAL ISLANDS.								
Toobooai	23	25	0	149	22	45		Idem.
Oparo	27	36	0	144	1	17		Idem.
Pitcairn Island	25	2	0	133	25	45		Carteret.
Ducie	24	40	30	124	40	15		Edwards.
Easter Island	27	8	13	109	44	16		Cook, La Perouse, Fleurieu
SOCIETY ISLANDS.								
Otaheite(Venus point)	17	29	17	149	33	15		Wales.
Idem, Port Oaitepiha	17	46	28	149	15	9		Idem.
Maitea	17	53	0	148	9	45		Idem.
Eimeo	17	30	0	148	0	0		Cook.
Idem	0	0	0	149	29	45		Wilson.
Huaheine	16	43	0	151	6	45		Cook's Chart.
Ulietea	16	46	0	151	38	45		Idem.
Borabora	16	27	0	151	51	45		Idem.
Lord Howe's Island	16	46	0	154	12	45		Wallis.
Scilly Island	16	28	0	155	24	45		Idem.
LOW ISLANDS, OR THE DANGEROUS ARCHIPELAGO.[b]								
Whitsunday Island	19	26	0	138	0	45		Idem.
Quatre Facardins	18	47	0	138	10	0		Bougainville.
Idem	0	0	0	138	39	45		Fleurieu.
The Harp or Bow	18	23	0	141	11	45		Cook.
The Chain	17	23	0	145	53	45		Idem.
Isle of Dogs	15	12	0	136	49	45		Burney.
Sondergrond or Sansfond[cd]	14	46	0	144	2	0		Idem.
Waterland	15	20	0	147	32	0		Idem.

[a] Adopted as the same, on the chart of Malte-Brun, but considered doubtful.
[b] "Archipel de la mauvaise mer."
[c] The longitude of all these islands, discovered by Lemaire and Schouten, is uncertain. But the results of Burney's learned calculations, in his History of Discoveries, deserve a place here
[d] Dutch and French, (bottomless.)

Table of the Geographical Positions, &c.—continued.

Places.	Latitude.				Longitude East or West from London.				Authorities.
	deg.	min.	sec.		deg.	min.	sec.		
Isle of Flies	17	25	0	S.	135	22	0	W.	Bœnechéa.[a]
St. Simon's Island	17	30	0		136	40	0		Idem.
St. Quintin's Island	18	18	0		137	16	0		Wilson.[b]
King George's Island	14	27	30		144	56	0		Byron and Cook.
Carlshof	15	45	0		145	15	0		Fleurieu.
Palliser's or Destructive Islands	15	26	0		146	30	0		Cook and Fleurieu.
Oanna, or the Labyrinth	15	47	0		149	0	0		Fleurieu, Turnbull.
Prince of Wales's Islands	15	38	15		149	0	0		Fleurieu, Turnbull.
Idem	0	0	0		151	47	45		Byron.[c]
	0	0	0		148	12	5		Fleurieu.
MARQUESAS ISLANDS.									
Chanal Island	7	51	0		140	16	15		Idem.
Isle Masse	8	0	0		140	29	0		Marchand.
The Two Brothers, (or Hergest's rocks)	8	51	0		140	34	15		Idem.
Nooaheeva, (or Sir Henry Martin's Island)	8	54	0		140	25	45		Idem.
Riou (or Roahooga)	9	5	0		139	10	15		Idem.
Idem	8	50	0		0	0	0		Vancouver.
Marchand's Island, (Trevanian Island, or Roopoa)	9	21	0		140	6	45		Fleurieu.
Hood's Island, or Tebooa	9	26	0		138	48	45		Cook.
Dominica or Ohivaroa	9	40	37		139	2	15		Cook's Astronomer.
Santa Christina, or Ohitahoo	9	55	30		139	9	5		Bayley & Wales.
San Pedro, or Onatéa	9	58	0		138	50	45		Idem.
La Madalena, or Ohitoa	10	25	30	S.	138	48	45	W.	Bayley & Wales.
ROGGEWYN'S ARCHIPELAGO, &c.									
Bauman Island (conjectural)	12	0	0		155	9	45		Fleurieu.
Tienhoven and Groningen (do.)	10	10	0		157	0	0		Idem.
Penrhyn Island	9	10	0		157	44	54		Severn & Watts.[d]
St. Bernard Island	10	20	0		161	9	45		Mendana, Quiros, Fleurieu.
Idem	10	10	0		157	41	45		Burney.
Islands of Danger	10	15	0		165	9	45		Byron.[e]
Christmas or Noel Island	1	58	0	N.	157	31	45		Cook
Palmyras	5	56	0		162	24	45		
Barbadoes	8	40	0		177	0	0		
SANDWICH ISLANDS.									
Owaihee, Karakakoa bay	19	18	0		156	0	0		Cook.
Ibid. Tyatatoa bay	19	37	30		156	5	15		Vancouver
Morotaï (east point)	21	4	0		156	49	45		Idem.
Woahoo, Whitelee bay	20	16	47		157	50	15		Idem.
Atooi, Whymoa bay	21	57	30		159	41	30		Idem.
Oneehow,[f] Yam bay	21	50	0		160	14	45		Cook.
Necker Island	23	34	0		164	31	45		La Perouse.
Shallows discovered by the French frigates[g]	23	45	0		165	49	45		Idem.

[a] A Spanish navigator, not much to be depended on.

[b] The learned M. Zimmerman, in his Australia, thinks that Serle Island is probably the same with St. Quintin

[c] Cook found that Byron placed King George's Islands too far west; and that error must have influenced the position of the Prince of Wales's Islands, discovered on the following day.

[d] This recent discovery happily supports Fleurieu's hypothesis on Roggewyn's Archipelago.

[e] According to Burney this island is identical with St. Bernard. Others would make it that of the *Gente Hermosa* of Quiros; but this last must be nearer Taumaco or Rotumahoo.

[f] "Oniihow."

[g] "Basse des frégates Françaises."

END OF THE FIRST VOLUME.